P3AM-3042-06ENZ0

ETERNUS

ETERNUS DX60/DX80/DX90

Disk storage system

User Guide

FUJITSU

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Preface

Fujitsu would like to thank you for purchasing our ETERNUS DX60/DX80/DX90 Disk storage system.
The ETERNUS DX60/DX80/DX90 Disk storage system is designed to be connected to a Fujitsu (PRIMEQUEST, PRIMERGY, or SPARC Enterprise) or other server.
This guide introduces the user to the ETERNUS DX60/DX80/DX90 Disk storage system (referred to as just "ETERNUS DX60/DX80/DX90" in the remainder of this manual), and explains the regular checks and maintenance required.
This guide is intended for use of ETERNUS DX60/DX80/DX90 in regions other than Japan and EMEA (Europe, Middle East and Africa).
Please carefully review the information outlined in this manual.

Sixth Edition
April 2010

Applicable Environment

The ETERNUS DX60/DX80/DX90 was designed and manufactured with user safety in mind. When using the ETERNUS DX60/DX80/DX90, follow the handling instructions, placement and cautionary notes listed in this guide. If used beyond the limits described, the users may be at risk of personal injury and/or material damage.

Using this Manual

The manuals provided with the ETERNUS DX60/DX80/DX90 contain important information regarding safe usage.
Please read these manuals carefully before using the ETERNUS DX60/DX80/DX90. Pay special attention to "ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions", and understand the contents thoroughly before connecting. Keep these manuals in a safe place for future reference.
Fujitsu pays careful attention to the safe use of its products to prevent user injury and/or material damage. To use the ETERNUS DX60/DX80/DX90 properly, please follow the instructions in this manual.

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The ETERNUS DX60/DX80/DX90 is designed, developed and manufactured as contemplated for general use, including without limitation, general office use, personal use, household use, and ordinary industrial use, but is not designed, developed and manufactured for use in situations with accompanying fatal risks or dangers that, unless extremely high safety is secured, could lead directly to death, personal injury, severe physical damage or other loss (hereinafter "High Safety Required Use"), including without limitation, nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, and missile launch control in weapon systems. Do not use the ETERNUS DX60/DX80/DX90 for High Safety Required Use without securing the sufficient safety level required. If you wish to use the ETERNUS DX60/DX80/DX90 for High Safety Required Use, please consult with our sales representative before such use.

Electromagnetic compatibility
Emissions: FCC Class A, EN55022 Class A and CNS 13438 Class A
Immunity: EN55024

Safety
CAN/CSA C22.2 No. 60950, UL60950 and EN60950

Class 1 laser product

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部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷线路板	×	○	×	○	○	○
HDD(硬盘)	×	○	○	○	○	○
机箱 底盘	×	○	×	○	○	○
电源	×	○	×	○	○	○
风扇机、电动机	×	○	×	○	○	○
电缆	×	○	×	○	○	○

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About this Manual

Organization

This manual is organized as follows:

- Chapter 1 Overview
  This chapter describes the special features, data configurations of RAID groups, and specifications of the ETERNUS DX60/DX80/DX90.
- Chapter 2 Components
  This chapter describes the components of the ETERNUS DX60/DX80/DX90.
- Chapter 3 Standard Operations
  This chapter describes how to turn the ETERNUS DX60/DX80/DX90 on and off, and how to attach and remove the front cover or flange cover.
- Chapter 4 Flow from Installation to Operation
  This chapter describes the flow of work from installation to the start of ETERNUS DX60/DX80/DX90 operation.
- Chapter 5 Installation
  This chapter describes the ETERNUS DX60/DX80/DX90 installation.
- Chapter 6 Cable Connection
  This chapter describes how to connect various cables to the ETERNUS DX60/DX80/DX90.
- Chapter 7 Setup
  This chapter describes how to set up the ETERNUS DX60/DX80/DX90 for operation.
- Chapter 8 Installing Optional Products
  This chapter describes how to install optional products.
- Chapter 9 Operation and Maintenance
  This chapter describes points to note when operating and performing maintenance for the ETERNUS DX60/DX80/DX90. It also describes how to change the configuration and the appropriate response to any problems which may occur.
  Read this chapter when operating or performing maintenance on the ETERNUS DX60/DX80/DX90, or if an error occurs.

"Specifications", "Events detected by ServerView", and "About Using of Open Sources" are described as appendixes.

Refer to the manuals for each peripheral concerning details not included in this manual.

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Warning Notations

Warning signs are shown throughout this manual in order to prevent injury to the user and/or material damage. These signs are composed of a symbol and a message describing the recommended level of caution. The following explains the symbols, their levels of caution, and their meanings as used in this manual.

WARNING	This symbol indicates the possibility of serious or fatal injury if the ETERNUS DX60/DX80/DX90 is not used properly.
CAUTION	This symbol indicates the possibility of minor or moderate personal injury, as well as damage to the ETERNUS DX60/DX80/DX90 and/or to other users and their property, if the ETERNUS DX60/DX80/DX90 is not used properly.
IMPORTANT	This symbol indicates IMPORTANT information for the user to note when using the ETERNUS DX60/DX80/DX90.

The following symbols are used to indicate the type of warnings or cautions being described.

Electric Shock	△ The triangle emphasizes the urgency of the WARNING and CAUTION contents. Inside the triangle and above it are details concerning the symbol (e.g. Electrical Shock).
No Disassembly	⃠ The barred "Do Not..." circle warns against certain actions. The action which should be avoided is both illustrated inside the barred circle and written above it (e.g. No Disassembly).
Unplug	● The black "Must Do..." disk indicates actions that must be taken. The required action is both illustrated inside the black disk and written above it (e.g. Unplug).

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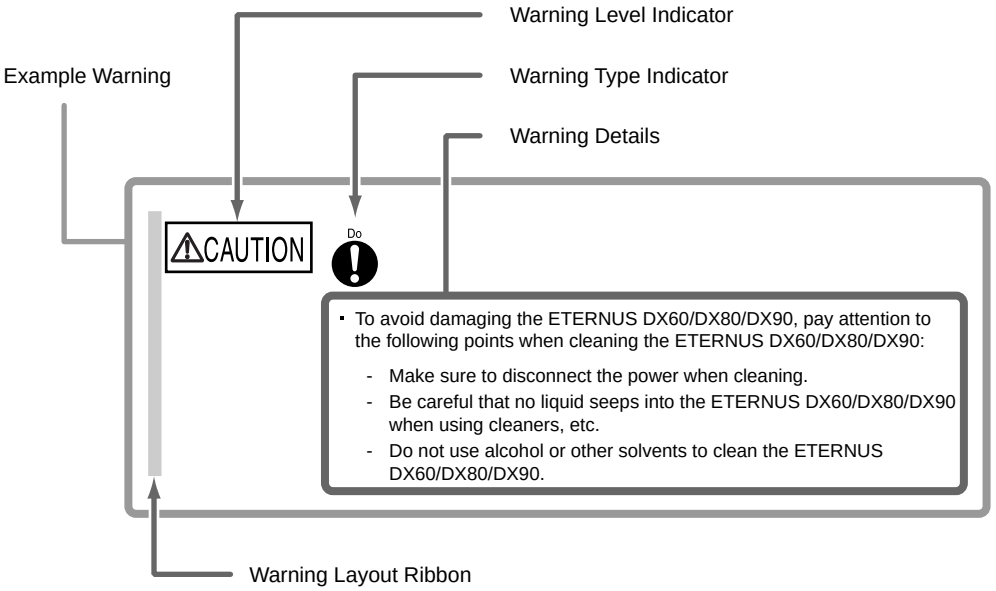
How Warnings are Presented in this Manual

A message is written beside the symbol indicating the caution level. This message is marked with a vertical ribbon in the left margin, to distinguish this warning from ordinary descriptions. An example is shown here.


Warning Level Indicator
Example Warning
Warning Type Indicator
Warning Details
CAUTION
Do
To avoid damaging the ETERNUS DX60/DX80/DX90, pay attention to the following points when cleaning the ETERNUS DX60/DX80/DX90:
- Make sure to disconnect the power when cleaning.
- Be careful that no liquid seeps into the ETERNUS DX60/DX80/DX90 when using cleaners, etc.
- Do not use alcohol or other solvents to clean the ETERNUS DX60/DX80/DX90.
Warning Layout Ribbon

Additional Information

Expressions and abbreviations

The following are expressions and abbreviations used throughout this manual:

Note	Functions and know how which can be useful when setting up or operating the ETERNUS DX60/DX80/DX90.
Refer	This notation indicates related reference manuals.

Product names and abbreviations

- "Windows®" represents the following products.
  - Microsoft® Windows® 2000 operating system
  - Microsoft® Windows Server® 2003 operating system
  - Microsoft® Windows Server® 2008 operating system

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Latest Information

The information in this document is subject to change without notice for functionality expansion of ETERNUS DX60/DX80/DX90 and improvement. The latest version of this document and the latest information about the ETERNUS DX60/DX80/DX90 is released in the following web-site. Access the following address if needed.

http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx-entry/

Related Manuals

Refer to the following related manuals in addition to this manual.

Manuals	Code	Description
ETERNUS DX60/DX80/DX90 Disk storage system Setup Guide (Fibre Channel model)	P3AM-3082	This manual describes how to ready Fibre Channel model devices for operation.
ETERNUS DX60/DX80 Disk storage system Setup Guide (iSCSI model)	P3AM-3092	This manual describes how to ready iSCSI model devices for operation.
ETERNUS DX60/DX80 Disk storage system Setup Guide (SAS model)	P3AM-3102	This manual describes how to ready SAS model devices for operation.
ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions	P3AM-3142	This manual describes the points to note when installing and operating the device.
ETERNUS DX60/DX80/DX90 Disk storage system Package Contents	P3AM-3062	This is the list of package contents for the device and optional products.
ETERNUS DX60/DX80/DX90 Disk storage system Using Optional Products	P3AM-3152	This manual describes the points to note when using optional products.
ETERNUS DX60/DX80/DX90 Disk storage system Feature activation licenses	P3AM-3312	This manual describes the Advanced Copy license.
ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)[*1]		This manual describes how to connect the ETERNUS DX60/DX80/DX90 to a server.
ETERNUS DX Disk storage systems Server Connection Guide (iSCSI)[*1]		
ETERNUS DX Disk storage systems Server Connection Guide (SAS)[*1]		
ETERNUS DX60/DX80/DX90 Web GUI User Guide	P2X0-0700	This manual describes how to monitor and set the ETERNUS DX60/DX80/DX90 via Graphical User Interface (GUI).

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Manuals		Code	Description
ETERNUS DX60/DX80/DX90 CLI User Guide		P2X0-0710	This manual describes how to monitor and set the ETERNUS DX60/DX80/ DX90 via Command Line Interface (CLI).
ETERNUS Multipath Driver V2.0 User's Guide			This manual describes how to use the optional ETERNUS Multipath Driver.
	(For Windows®)	P2WW-1451	
	(For Linux)	P2U3-0031	
	(For AIX)	P2U3-0051	
ETERNUS Multipath Driver V3.0 User's Guide			
	For Solaris™ Operating System	P2S0-0062	
ETERNUS MPIO for IBM AIX V2.0.2 Installation & Configuration Guide for AIX		P2U3-0150	

*1: Download the necessary manuals for the customer operating environment (for server OS, Fibre Channel card type, etc.) from the specified web-site. For the URL of the download web-site, refer to the Documentation CD provided with the ETERNUS DX60/DX80/DX90.

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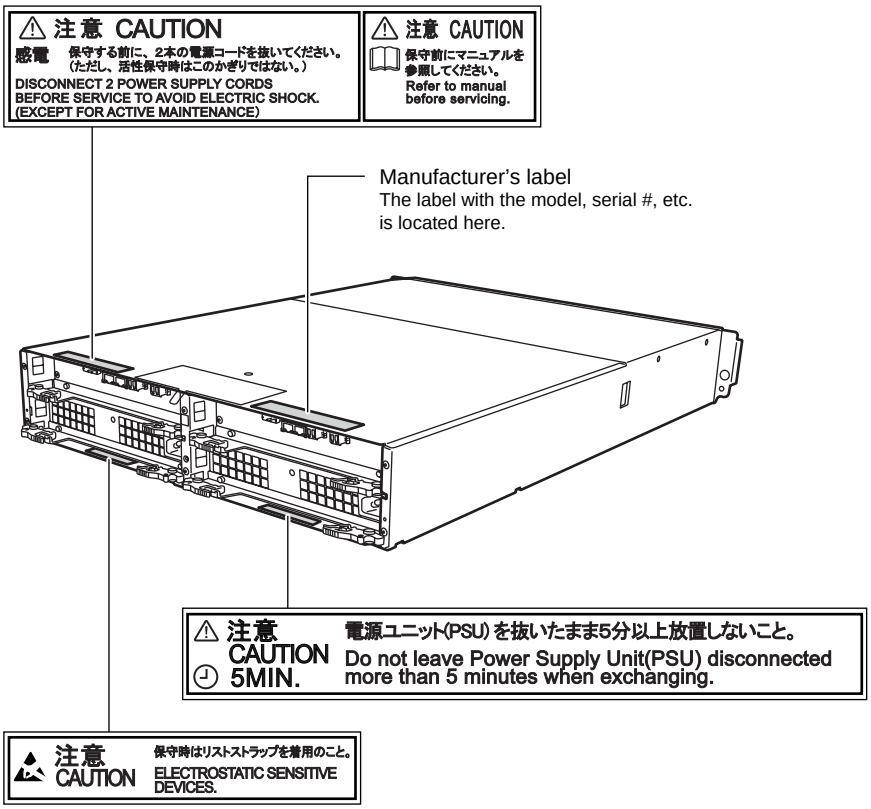
Labels

Warning labels and manufacturer's labels are found in various places of the ETERNUS DX60/ DX80/DX90, as shown in the example below.
Do not remove these labels.

Controller Enclosure



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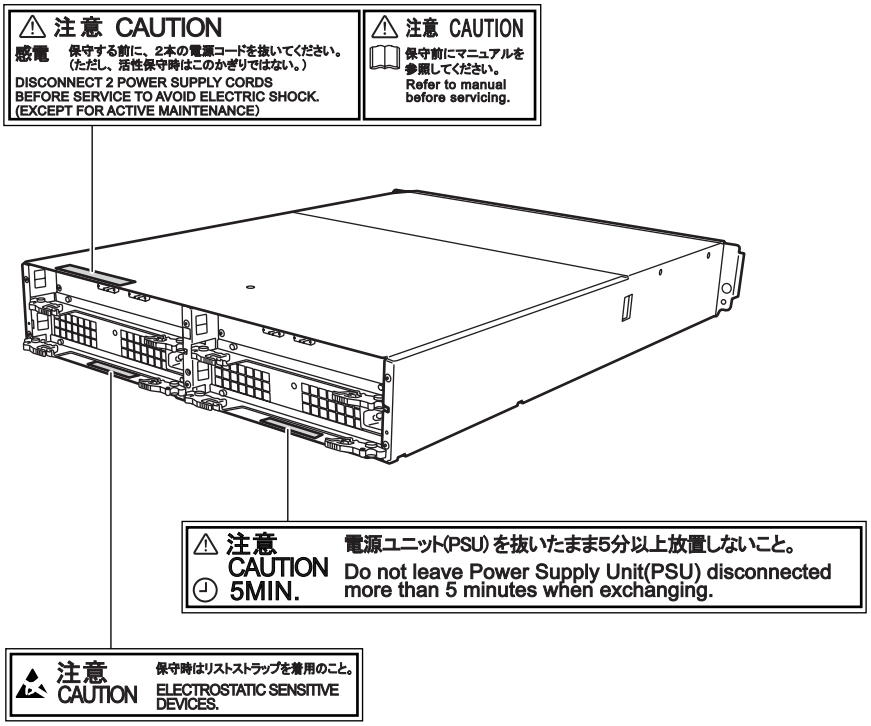
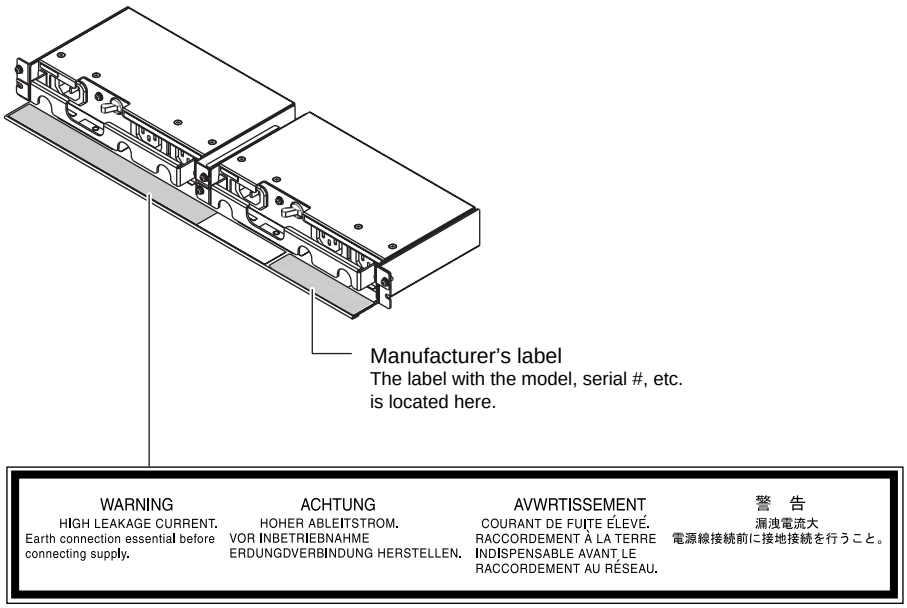
Drive Enclosure



AC Outlet Box (1U)



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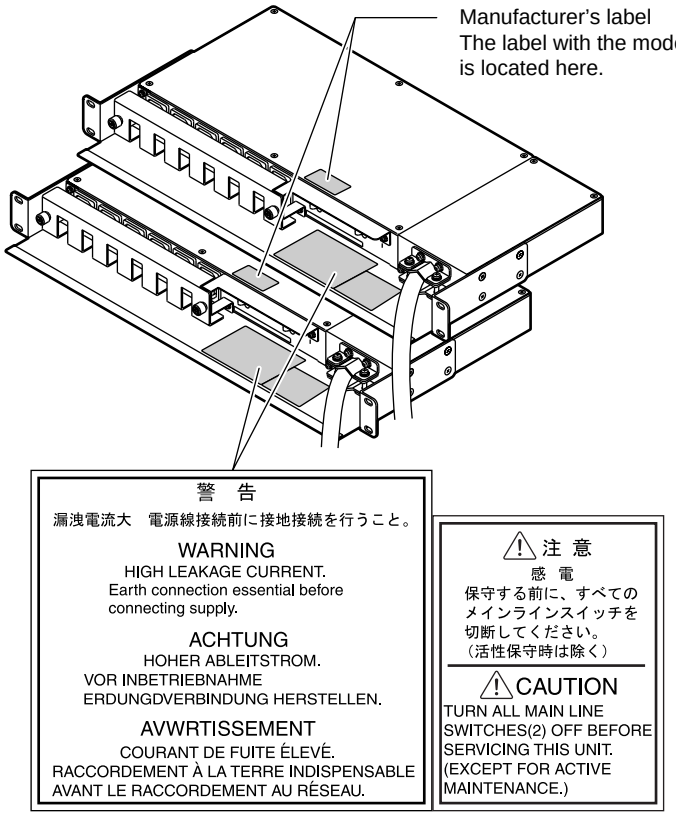
AC Outlet Box (2U)



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Chapter 1 Overview

This chapter provides an overview of the ETERNUS DX60/DX80/DX90 features, and specifications.

1.1 System Features

Special features of the ETERNUS DX60/DX80/DX90 are shown below:

Space and Energy Savings

- Compact design makes effective use of rack space
  - Three models are available; ETERNUS DX60, ETERNUS DX80, and ETERNUS DX90. All models are compactly-designed to use rack space efficiently, coming in 2U size (*1) enclosures.

    *1: 2U = Two 19-inch rack units = 88mm device height
  - Two types of controller enclosure and drive enclosures (optional) are available; those for 3.5" disks and those for 2.5" disks.
    Up to twelve 3.5" disks can be installed in the 3.5" type enclosures, and up to twenty-four 2.5" disks can be installed in the 2.5" type enclosures. The appropriate drive configuration should be decided based on the purpose, applications and onsite installation space available for the ETERNUS DX60/DX80/DX90.
  - Up to 24 disks can be installed in the ETERNUS DX60 and up to 120 disks in the ETERNUS DX80/DX90.
- Energy savings by the latest technology

  Power efficiency and energy savings are achieved with advanced technology.
- Eco-mode to reduce environmental load

  Using the Eco-mode function to start and stop the spindle rotation in the disk for each RAID group during the specified hour. Stop the spindle rotation when there is no access to the disk to reduce power consumption and decrease environmental load.
- Visualization of power consumption and ambient temperature

  Power consumption and ambient temperature for the entire ETERNUS DX60/DX80/DX90 can be checked using the (optional) "ETERNUS SF Storage Cruiser" integrated management software's Graphical User Interface (GUI). Both current status and historical records (for a day, a week, or an year) can be displayed.

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Easy Installation and Operation Management

- Settings of the ETERNUS DX60/DX80/DX90 and its operation management can be performed by GUI that uses a Web browser (hereafter referred to as "GUI"), or CLI that uses commands and command scripts.

  Settings required for the ETERNUS DX60/DX80/DX90 initial installation can be easily performed by following the GUI wizard and inputting parameters for displayed setting items. The ETERNUS DX60/DX80/DX90 can be configured, and its status can be displayed and monitored using GUI or CLI.

- ETERNUS SF Express

  ETERNUS SF Express is a storage system introduction and operation support software for the user who had put off the introduction of the storage system up to now because of "Difficulty" and "Introduction and operation cost increase".
  ETERNUS SF Express is an easy to use software addition to ETERNUS DX Disk storage system, in order to facilitate management of ETERNUS DX Disk storage system as well as leverage ETERNUS DX Disk storage system functionality like Snapshots, Cloning or Replication.
  For details of ETERNUS SF Express and how to download it, refer to the following web-site:

  http://www.fujitsu.com/global/support/computing/storage/software/esf-express.html

High scalability and versatile connectivity

- Utilizes the latest disk technology

  Both 3.5" SAS disks (*1) (300GB/450GB/600GB; 15,000rpm), and 2.5" SAS disks (*1) (146GB/300GB; 10,000rpm) are available.
  For data backup and archival purposes the ETERNUS DX60/DX80/DX90 is able to use large capacity, highly cost effective 3.5" Nearline SAS disks (*1) (750GB/1TB/2TB; 7,200rpm).
  Flash memory based 3.5" SSDs (*2) (100GB/200GB) and 2.5" SSDs (*2) (100GB/200GB) are also available (except for the ETERNUS DX60, which does not support SSDs).

  *1: SAS: Serial Attached SCSI
  *2: SSD: Solid State Drive

- Supports capacity expansion during system operation
  - Disks and drive enclosures can be added during the system operation.
  - RAID group capacity can be expanded by adding disk from the unit of one.
  - Volume can be expanded during the system operation. Even when the work load increased rapidly, the ETERNUS DX60/DX80/DX90 flexibly expand the volume capacity with no interruption of the operation.

- High connectivity supports the multi-platform environment
  - FC-SAN, IP-SAN, and DAS environments are supported, with Fibre Channel (maximum transfer speed: 8Gbit/s), iSCSI (maximum transfer speed: 1Gbit/s), and SAS (maximum transfer speed: 3Gbit/s) host interfaces being used, respectively.

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- The ETERNUS DX60/DX80/DX90 supports multiple Operating Systems such as UNIX, Linux, Windows®, and VMware®, and can be connected as a storage system for PRIMEQUEST, SPARC Enterprise, PRIMERGY servers as well as for UNIX/IA servers of other companies. Also the RAID aggregation using SAN (Storage Area Network) is available.

Data integrity with high-speed backup

- Nearline SAS disks for data backup and archiving
  - Using large capacity / cost effective Nearline SAS disks allows low cost D2D (Disk to Disk) backup and high-speed recovery in the case of unexpected failure.
  - Storing the less frequently accessed data such as archive data in the Nearline SAS disks allows easy reading. Nearline SAS disks and SAS disks can be installed in the same drive enclosure.
- Backup function

  Using the Advanced Copy function allows the high-speed copying of disk volumes at any given time.
- Data integrity against disasters

  Using the Remote Advanced Copy functions (enhanced Advanced Copy functions), data can be copied between multiple ETERNUS DX90s without burdening the server. In addition, using the Extended Remote Advanced Copy functions, data can be copied between ETERNUS DX90s in the remote place that are connected with SAN-WAN-SAN topology, which enables duplication of database and backup to a remote place in the case of disaster.

High reliability supports 24/7/365 operation

- Duplication of important components

  Important components such as controllers (for dual-controller model), power supply units, and fans are duplicated to continue the operation in the case of unexpected failure. Also this allows the hot swapping of failed components with the device power on. In addition, the latest firmware can be applied during system operation.
- Various supported RAID levels

  The ETERNUS DX60/DX80/DX90 supports RAID5+0 that is superior to RAID5 in reliability and performance, and RAID6 that responds to the double failure of disks, as well as RAID1, RAID1+0, and RAID5. A flexible RAID configuration can be selected.
- Redundant copy ensures disk redundancy

  The ETERNUS DX60/DX80/DX90 diagnostic routines test the disks in order to predict failures before they happen. When a disk requires preventive maintenance, a hot spare is automatically switched in to replace it, providing continued data redundancy and stable operation.
- Block Guard ensures data integrity

  The ETERNUS DX60/DX80/DX90 adds check codes and check them at multiple checkpoints on data transfer path to ensure the data integrity.

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- System Capacitor Unit (SCU)

  A SCU that does not need to be regularly replaced is installed as a backup power source in case of a power failure. If the power fails, the SCU enables the cache memory data to be saved to flash memory. Therefore, unlike a battery, the SCU does not have a time limit to save data. The SCU is charged so quickly that write performance is recovered right after power recovery.

E-mail notification

If an error occurs in the ETERNUS DX60/DX80/DX90, the details can be sent to a specified e-mail address.

Strengthening security against information leaks

- Data encryption to prevent information leaks

  Data can be encrypted and written. Data encryption can prevent information leaks caused by fraudulent decoding even if the disk is stolen.

Note

Data encryption may not be possible for some configurations.

- Protection against fraudulent access

  The ETERNUS DX60/DX80/DX90 supports SSL/SSH that encrypts and communicates information on the network. This protects against malicious use of data and fraudulent access to devices via a Web browser (GUI) or CLI.

RoHS compliance

The ETERNUS DX60/DX80/DX90 complies with RoHS, as mandated by the Council of Europe and our board of directors. RoHS limits the use in electric and electronic equipment of six specific chemicals: lead, hexavalent chromium, mercury, cadmium, PBB (polybrominated biphenyl), and PBDE (polybrominated diphenyl ether). In addition, lead-free soldering is used for all printed-wiring boards.

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1.2 Configuration

This chapter describes items to be noted before configuring the ETERNUS DX60/DX80/DX90 systems.

1.2.1 RAID Level

This section describes the supported RAID level and usage (RAID level selection criteria), and RAID group configuration.

Supported RAID levels and mechanism

The ETERNUS DX60/DX80/DX90 supports the following RAID levels.

- RAID0 (striping)
- RAID1 (mirroring)
- RAID1+0 (striping of pairs of disks for mirroring)
- RAID5 (striping with distributed parity blocks)
- RAID5+0 (double striping with distributed parity blocks) (*1)
- RAID6 (striping with distributed double parity blocks) (*2)

*1: RAID5+0 is a RAID system in which the data on RAID5 volumes is then RAID0 striped.

*2: RAID6 ensures data safety and continues system operation in the case of a second malfunction within a single RAID group.

CAUTION

Do

- Remember that a RAID0 configuration is not redundant. This means that if a RAID0 disk fails, the data will not be recoverable. Therefore, using RAID1, RAID1+0, RAID5, RAID5+0, or RAID6 configuration is recommended.

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Each RAID level description is shown below.

- RAID0 (striping)

  Data is split in unit of blocks and stored across multiple disks.

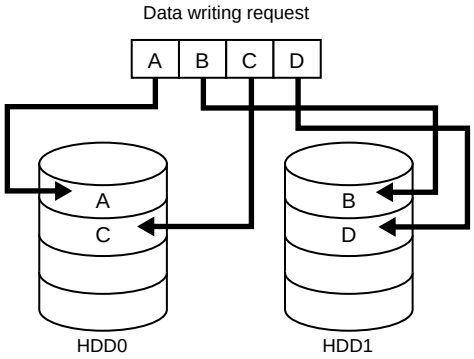

Figure 1.1 RAID0 concept

- RAID1 (mirroring)

  RAID1 stores the same data on two duplicated disks at the same time.
  If one disk fails, other disk continues operation.

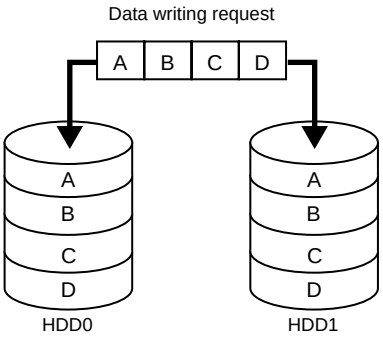

Figure 1.2 RAID1 concept

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- RAID1+0 (striping of pairs of disks for mirroring)

  RAID1+0 combines the performance of RAID0 (striping) with the reliability of RAID1 (mirroring).

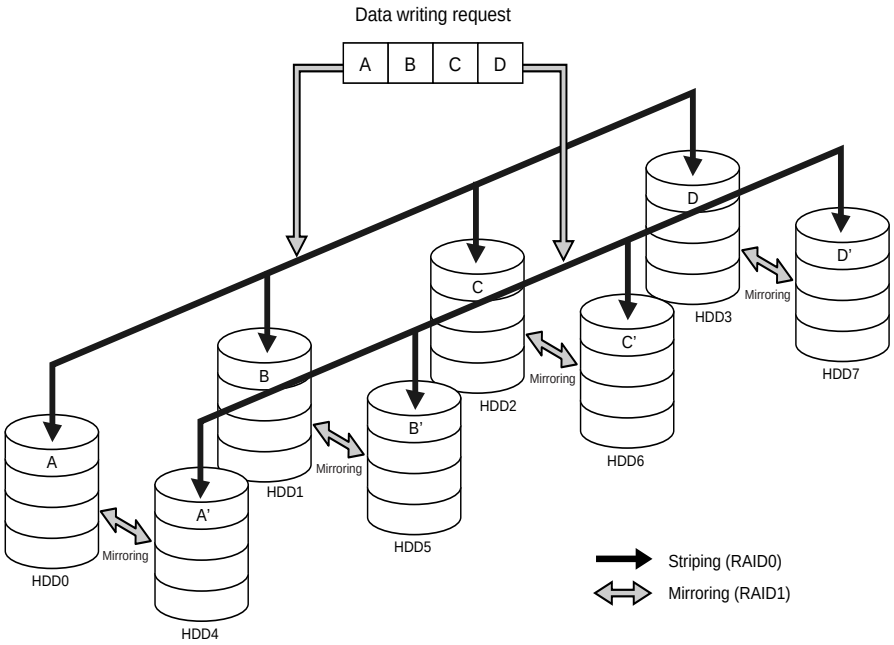

Figure 1.3 RAID1+0 concept

- RAID5 (striping with distributed parity)

  Data divided into units of blocks and allocated across multiple disks together with parity information created from the data. If one disk fails, the remaining data and parity blocks are sufficient to allow the recovery of the lost data.

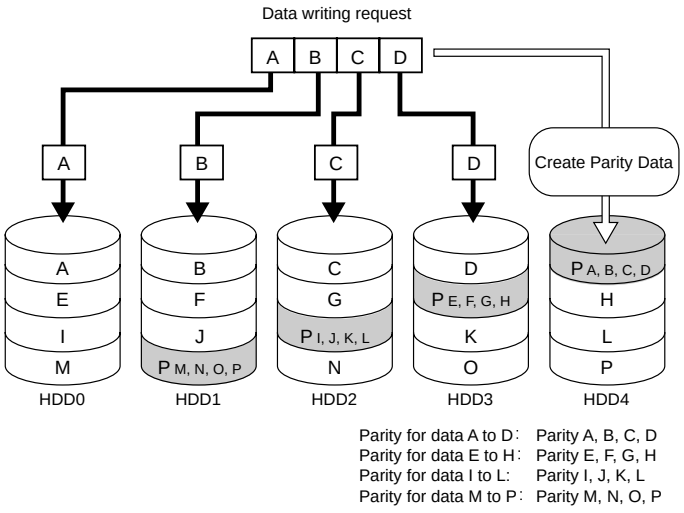

Figure 1.4 RAID5 concept

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- RAID5+0 (double striping with distributed parity)

  Multiple RAID5 volumes are RAID0 striped. For large capacity configurations, use of RAID5+0 instead of RAID5 results in enhanced performance, improved reliability, and shorter rebuilding times.

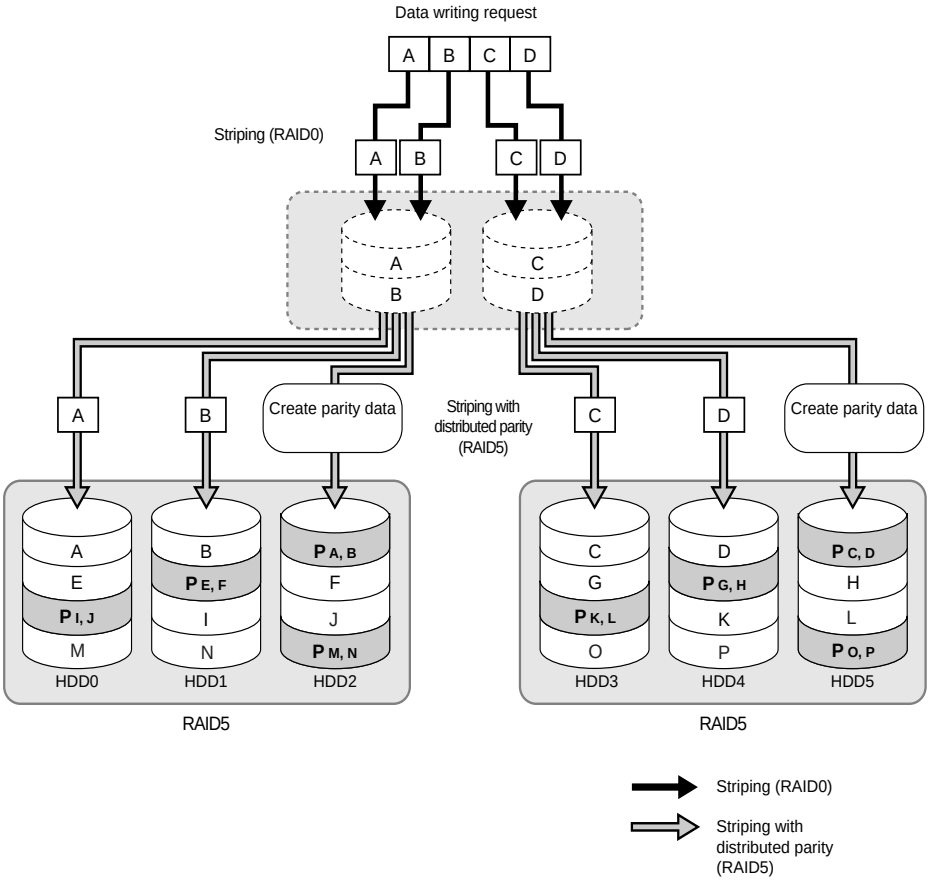
Data writing request
A B C D
Striping (RAID0)
A B C D
A B C D
A B Create parity data
Striping with distributed parity (RAID5)
C D Create parity data
A E P I, J M
B P E, F I N
P A, B F J P M, N
C G P K, L O
D P G, H K P
P C, D H L P O, P
HDD0 HDD1 HDD2 HDD3 HDD4 HDD5
RAID5
RAID5
Striping (RAID0)
Striping with distributed parity (RAID5)

Figure 1.5 RAID5+0 concept

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- RAID6 (striping with distributed double parities)

  Store two different parities on different disks (double parities) to recover from up to two disk failures.

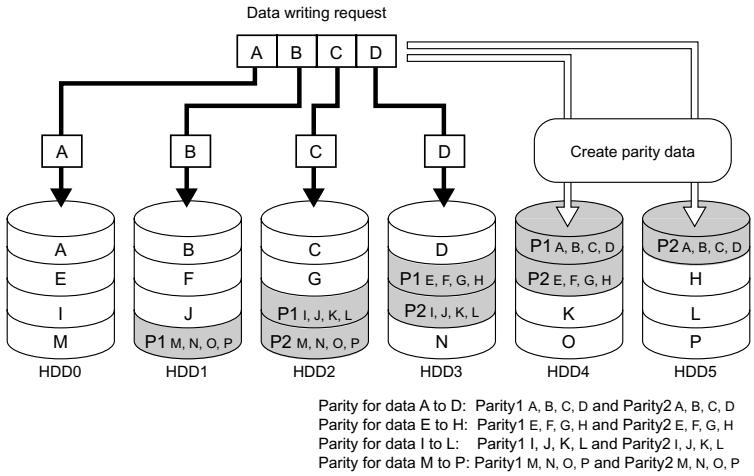
Data writing request
A
B
C
D
Create parity data
HDD0
HDD1
HDD2
HDD3
HDD4
HDD5
Parity for data A to D: Parity1 A, B, C, D and Parity2 A, B, C, D
Parity for data E to H: Parity1 E, F, G, H and Parity2 E, F, G, H
Parity for data I to L: Parity1 I, J, K, L and Parity2 I, J, K, L
Parity for data M to P: Parity1 M, N, O, P and Parity2 M, N, O, P

Figure 1.6 RAID6 concept

User capacity for each RAID level

User capacity varies according to the RAID level.
Table 1.1 shows the user capacity per disk. Table 1.2 shows the formula for calculating the user capacity for each RAID level.

Table 1.1 User capacity per disk

Product name	User Capacity per Disk (*1)
100GB SSD	92,672MB
200GB SSD	186,624MB
146GB SAS disk	135,936MB
300GB SAS disk	279,040MB
450GB SAS disk	419,072MB
600GB SAS disk	559,104MB
750GB Nearline SAS disk	702,976MB
1TB Nearline SAS disk	937,728MB
2TB Nearline SAS disk	1,866,240MB

*1: The above User Capacities are based on a 1MB = $1,024^2$Byte metric.

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Table 1.2 Formula for calculating user capacity for each RAID level

RAID level	Number of disks (*1)	Formula for user capacity computation
RAID0	2 to 16	Disk capacity × Number of disks
RAID1	2	Disk capacity × Number of disks/2
RAID1+0	4 to 32	Disk capacity × Number of disks/2
RAID5	3 to 16	Disk capacity × (Number of disks - 1)
RAID5+0	6 to 32	Disk capacity × (Number of disks - 2)
RAID6	5 to 16	Disk capacity × (Number of disks - 2)

*1: Actual number of disks can be installed depend on the models.

Reliability, performance, capacity for each RAID level

Table 1.3 shows the comparison result of reliability, performance, capacity for each RAID level.

Table 1.3 User capacity for each RAID level

RAID level	Reliability	Performance (Writing speed) (*1)	Capacity
RAID0	Bad	Very Good	Very Good
RAID1	Good	Good	Not Bad
RAID1+0	Good	Very Good	Not Bad
RAID5	Good	Good	Good
RAID5+0	Good	Good	Good
RAID6	Very Good	Good	Good

*1: Performance may differ according to the number of disks and the processing method from the host.

Recommended RAID level

Select the appropriate RAID level according to the usage.

- Recommended RAID level is RAID1, RAID1+0, RAID5, RAID5+0 and RAID6.
- For read and write performance, RAID1+0 configuration is recommended.
- For read only file servers and backup servers, RAID5, RAID5+0, or RAID6 can also be used. However, if the disk fails, note that data restoration from parities and rebuilding process may result in a loss in performance.

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1.2.2 RAID Groups and Volumes

RAID group

In an ETERNUS DX60/DX80/DX90 Disk storage system, you can set up the RAID groups to all use the same RAID level or a mixture of different RAID levels.

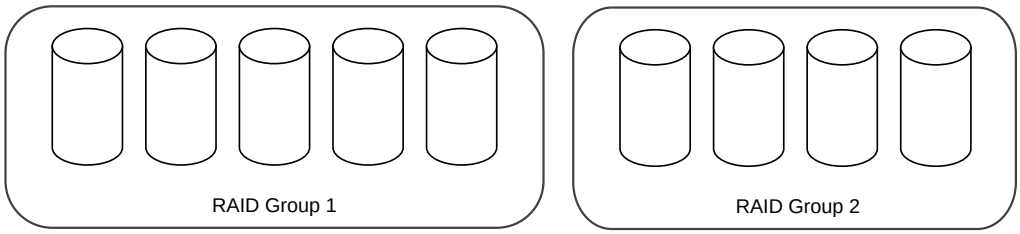

Figure 1.7 Example of a RAID group

Table 1.4 show the recommended number of disks that configures a RAID group.

Table 1.4 Recommended number of disks per RAID group

RAID level	Recommended number of disks
RAID1	2
RAID1+0	4, 6, 8, 10
RAID5	3, 4, 5, 6
RAID5+0	6, 8, 10, 12
RAID6	5, 6, 7

Note

- Adding more disks to a RAID group improves performance.
- Use of higher capacity disks in a RAID group will increase the time required for the disk rebuild process to complete.
- The more disks per RAID5, RAID5+0, or RAID6 group, the longer the period of time for data restoration from parities and rebuilding process.

Volume

Logical disk areas in RAID groups are called volumes.
A volume is the basic RAID unit, that can be recognized by the server.

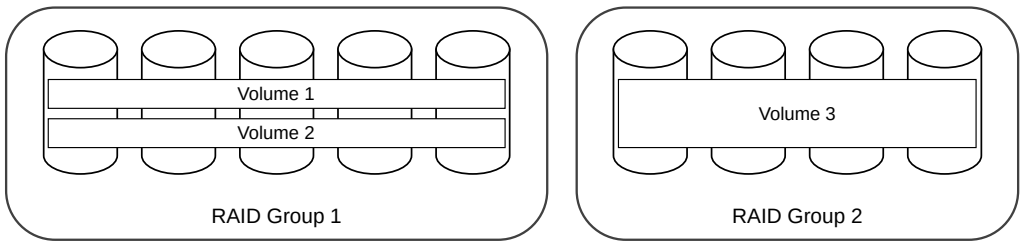

Figure 1.8 RAID group concept

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- Table 1.5 shows the maximum number of volumes that can be set.

Table 1.5 The maximum number of volumes that can be set

Model	Per RAID group	Per storage system
ETERNUS DX60	Max. 128	Max. 512
ETERNUS DX80/DX90	Max. 128	Max. 1,024

- Table 1.6 shows the time for volume formatting (when the volume capacity is 100GB).

Table 1.6 Volume formatting time (for SAS disks and Nearline SAS disks)

RAID level	No. of disks	Time required for volume formatting (*1)		
		3.5" SAS disks	2.5" SAS disks	Nearline SAS disks
RAID1	2	Approx. 35 minutes/100GB	Approx. 40 minutes/100GB	Approx. 73 minutes/100GB
RAID1+0	8	Approx. 25 minutes/100GB	Approx. 30 minutes/100GB	Approx. 43 minutes/100GB
RAID5	5	Approx. 25 minutes/100GB	Approx. 25 minutes/100GB	Approx. 49 minutes/100GB
RAID5+0	6	Approx. 25 minutes/100GB	Approx. 30 minutes/100GB	Approx. 43 minutes/100GB
RAID6	6	Approx. 30 minutes/100GB	Approx. 40 minutes/100GB	Approx. 58 minutes/100GB

*1: The value shows the time required for volume formatting when the volume capacity is 100GB and there is no server I/O. The time depends on the disk configuration or the disk type.

- No more than 8TB can be used for any one volume. However, the maximum allowed volume capacity is OS dependent.

1.2.3 System Disks

System disks are disks which have part of their area assigned for use by the system (the system area), and two system disks are installed in Slot0 and Slot1 in the controller enclosure.

WARNING

Do Not

- Do not remove system disks. Doing so will render the ETERNUS DX60/DX80/DX90 unusable.

IMPORTANT System disks cannot be registered as hot spares.

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1.2.4 Hot Spare

Hot spares are used as spare disks for when disks in a RAID group fail, or are in error status. The following two types of hot spare are available:

- Global Hot spare
  This is available for any RAID group.
- Dedicated Hot spare
  This is only available to one specified RAID group.

Note

Assign "Dedicated Hot spares" to RAID groups that contain important data, in order to preferentially improve their access to hot spares.

For details about Global Hot spare and Dedicated Hot spare, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"

Make sure to register sufficient hot spares. If a free hot spare is available, when one of the RAID group disks has a problem, data from this disk is automatically replicated into the hot spare.

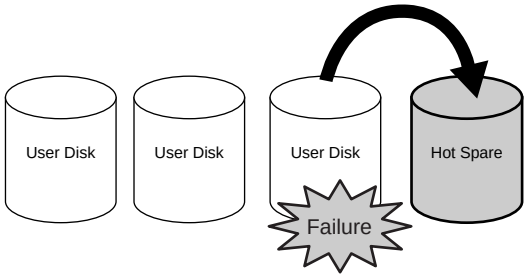

Figure 1.9 Hot Spares

CAUTION

Do

- If a disk configured in a RAID1, RAID1+0, RAID5, RAID5+0, or RAID6 group fails, contact your maintenance engineer immediately as the failed disk should be replaced at once. If another disk fails before the first disk that failed is replaced, the data of the second disk may be lost.

IMPORTANT

System disks cannot be registered as hot spares.

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1.2.5 Disks

Three kinds of drives can be installed in the device: SAS disks, Nearline SAS disks, and SSDs. Each is suitable for the following usage cases:

- SAS Disk
  SAS disks are highly-performance/high-reliability disks for enterprise use. SAS disks support 24/7/365 operations and are used to store high performance databases and other frequently accessed data.
  2.5" SAS disks take less space, consume less electrical power, and are lighter than 3.5" SAS disks.

- Nearline SAS Disk
  Nearline SAS disks are high capacity / cost effective disks for data backup and archive use. Nearline SAS disks can store information that requires a lower access rate at a still reasonable speed more cost effectively than the SAS disks.

- SSD (Solid-State Drive)
  SSDs are highly-performance/high-reliability drives for enterprise use. SSDs support 24/7/365 operations and are used to store high performance databases and other frequently accessed data. SSDs use flash memory as their storage media and provide better random access performance than SAS and Nearline SAS hard disks. Containing no motors or other moving parts, SSDs are highly resistant to impact and have low power consumption requirements.
  2.5" SSDs take less space and are lighter than 3.5" SSDs.

1.2.6 Host Interface

The ETERNUS DX60/DX80 supports three types of host interfaces: the Fibre Channel interface, the iSCSI interface, and the SAS interface. The ETERNUS DX90 supports the Fibre Channel interface.

- Fibre Channel interface
  Fibre Channel supports two connection topologies, Arbitrated Loop and Fabric.
  Maximum transfer speed is 4Gbit/s for the ETERNUS DX60, 8Gbit/s or 4Gbit/s for the ETERNUS DX80, and 8Gbit/s for the ETERNUS DX90.
  Fibre Channel is commonly used for database servers. A fabric connection via an FC switch will allow a large number of high-performance hosts to connect to a single port if required.

- iSCSI interface
  iSCSI is a communication protocol which transfers SCSI commands within IP packets over Ethernet, and has a maximum transfer speed of 1Gbit/s.
  Since iSCSI can be installed at lower cost than Fibre Channel, it is commonly used by divisions of large companies and by small-and-medium-sized companies.
  In order to secure iSCSI performance, it is recommended that the iSCSI network be physically separated from other typical purpose networks such as those used for Internet access and file transfer.

- SAS interface
  SAS (Serial Attached SCSI) is a serial transfer host interface that is as reliable as the normal (parallel) SCSI interface, but has a higher maximum transfer speed of 3Gbit/s.
  SAS is used to connect servers and DAS (Direct Attached Storage) devices and, while providing less expandability than a SAN connection, is still suitable for small-sized systems.

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1.3 Functions

This section describes the main ETERNUS DX60/DX80/DX90 functions.

1.3.1 Rebuild/Copyback

When a disk fails and the RAID group redundancy has been broken, Rebuild/Copyback restores the disk status back to normal status as a background process.

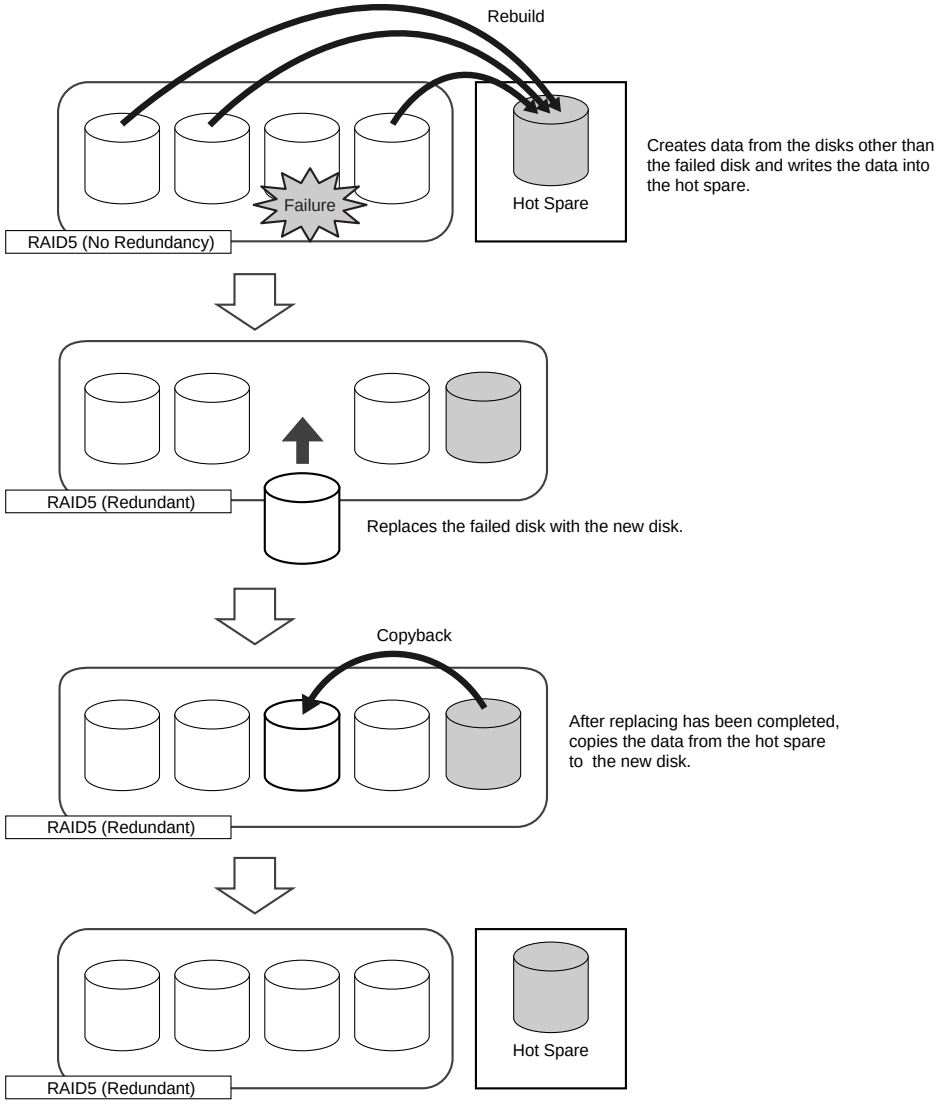
Rebuild
Failure
Hot Spare
RAID5 (No Redundancy)
Creates data from the disks other than the failed disk and writes the data into the hot spare.
RAID5 (Redundant)
Replaces the failed disk with the new disk.
Copyback
After replacing has been completed, copies the data from the hot spare to the new disk.
RAID5 (Redundant)
Hot Spare
RAID5 (Redundant)

Figure 1.10 Rebuild/Copyback function

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Table 1.7 shows the times (for 100GB volumes) required for the rebuild process to complete for various disk configurations.

Table 1.7 Rebuild process times (for SAS disks and Nearline SAS disks)

RAID level	No. of disks	Rebuild process time (*1)		
		3.5" SAS disks	2.5" SAS disks	Nearline SAS disks
RAID1	2	Approx. 20 minutes/100GB	Approx. 27 minutes/100GB	Approx. 47 minutes/100GB
RAID1+0	8	Approx. 5 minutes/100GB	Approx. 7 minutes/100GB	Approx. 11 minutes/100GB
RAID5	5	Approx. 10 minutes/100GB	Approx. 10 minutes/100GB	Approx. 15 minutes/100GB
RAID5+0	6	Approx. 7 minutes/100GB	Approx. 7 minutes/100GB	Approx. 11 minutes/100GB
RAID6	6	Approx. 13 minutes/100GB	Approx. 13 minutes/100GB	Approx. 21 minutes/100GB

*1: The time required to rebuild a 100GB volume of the indicated RAID level, number and type of disks when there is no concurrent server I/O.

Table 1.8 shows the times (for 100GB volumes) required for the copyback process to complete for various disk configurations.

Table 1.8 Copyback process times (for SAS disks and Nearline SAS disks)

RAID level	No. of disks	Copyback process time (*1)		
		3.5" SAS disks	2.5" SAS disks	Nearline SAS disks
RAID1	2	Approx. 20 minutes/100GB	Approx. 27 minutes/100GB	Approx. 49 minutes/100GB
RAID1+0	8	Approx. 5 minutes/100GB	Approx. 7 minutes/100GB	Approx. 11 minutes/100GB
RAID5	5	Approx. 7 minutes/100GB	Approx. 10 minutes/100GB	Approx. 16 minutes/100GB
RAID5+0	6	Approx. 5 minutes/100GB	Approx. 7 minutes/100GB	Approx. 11 minutes/100GB
RAID6	6	Approx. 13 minutes/100GB	Approx. 13 minutes/100GB	Approx. 20 minutes/100GB

*1: The time required to copyback a 100GB volume of the indicated RAID level, number and type of disks when there is no concurrent server I/O.

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1.3.2 Redundant Copy

The Redundant Copy function creates data in the disk, in which the Disk Patrol function decides that preventative maintenance is required, from the other disks to the hot spare. With this function, you can restore the data while maintaining redundancy.

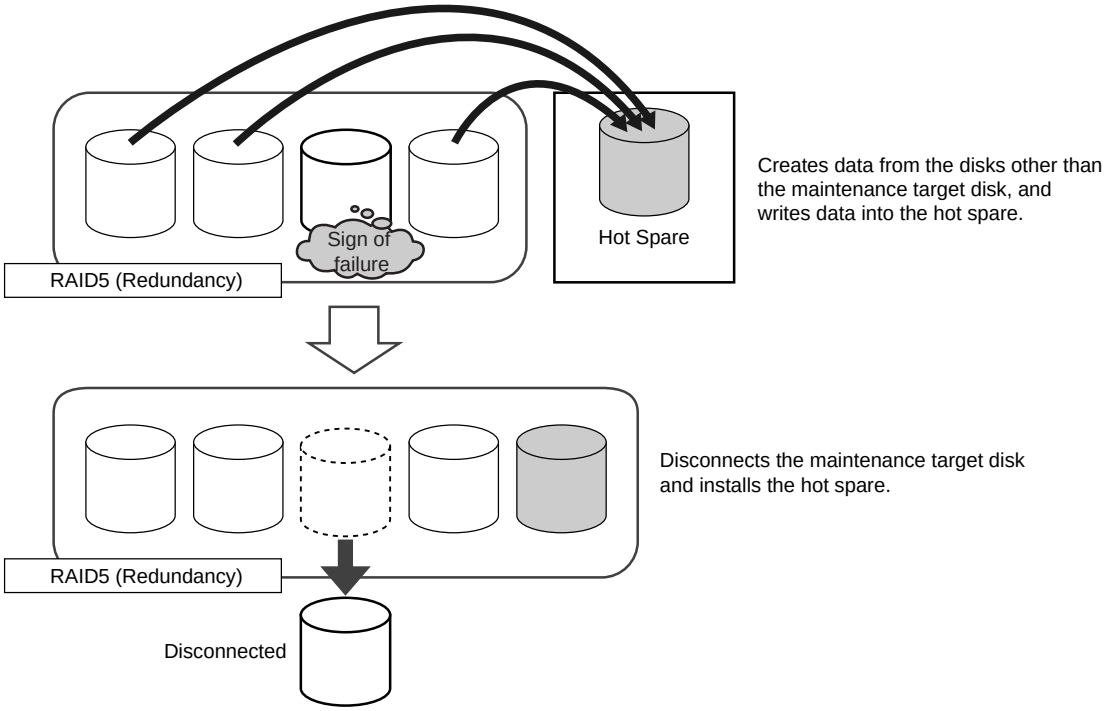
Sign of failure
RAID5 (Redundancy)
Hot Spare
Creates data from the disks other than the maintenance target disk, and writes data into the hot spare.
RAID5 (Redundancy)
Disconnected
Disconnects the maintenance target disk and installs the hot spare.

Figure 1.11 Redundant Copy Function

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1.3.3 Advanced Copy

The Advanced Copy functions allows the ETERNUS DX60/DX80/DX90 to carry out high-speed data copying operations on its own, with no need to draw on server resources.

The Advanced Copy functions of the ETERNUS DX60/DX80/DX90 have the following uses:

- Data snapshots via GUI or CLI commands
- Fast data copies with ETERNUS SF Express
- Data backup in a live data environment using the Microsoft® Windows Server® Volume Shadow Copy Service function (hereafter referred to as "VSS") with VSS-compatible backup software
  To use the Advanced Copy functions in a VSS environment, the "ETERNUS VSS Hardware Provider" software must be downloaded and installed on the server. For details of "ETERNUS VSS Hardware Provider" and how to install it, refer to the following web-site:

  http://www.fujitsu.com/global/support/computing/storage/system/vsshp.html

- Quick data backup, restoration and replication with ETERNUS SF AdvancedCopy Manager
  This also allows data backup in a live data environment via links with Oracle, SQL Server, and Exchange Server software.

The following shows an example of an Advanced Copy operation using ETERNUS SF AdvancedCopy Manager.

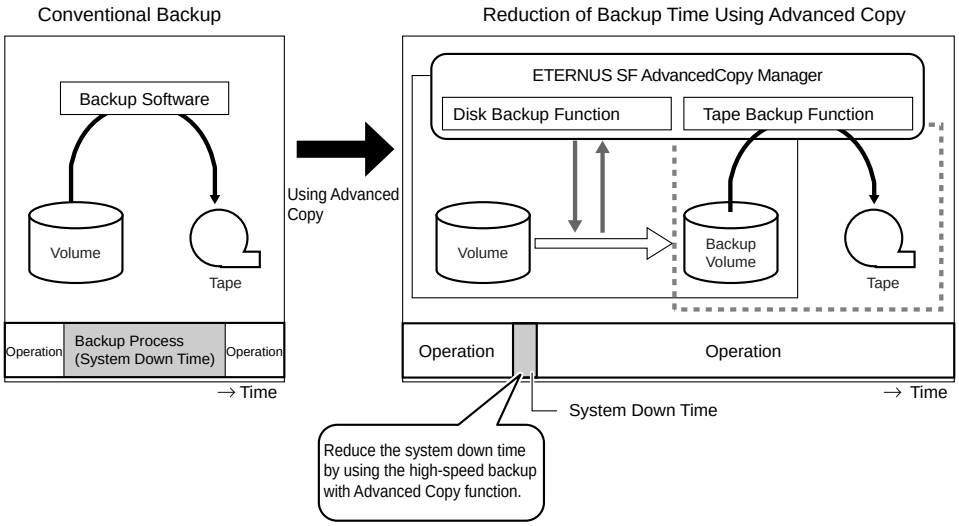

Figure 1.12 Example of an Advanced Copy operation

The following five methods are available as the Advanced Copy function.

- OPC (One Point Copy)

  One Point Copy (OPC) is a function that copies data in the volume (copy source) to another volume in the same device (copy destination) at a specific point in time.
  OPC is suitable for the following usages.
  - Making backup
  - Making replicas
  - Restoration from the backup data (restoration after replacing a disk when the copy source disk has failed)

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- QuickOPC

  QuickOPC copies all data as initial copy as OPC. After the initial copy has completed, only updated data (differential data) need to be copied hereafter.
  QuickOPC is suitable for the following usages.

  - Making backup for less updated data
  - Making system test data replication
  - Restoration from the backup

- SnapOPC+

  As updates occur in the source data, SnapOPC+ saves the pre-change for each affected generation level. Registering standby storage areas in the SDP allows SnapOPC+ copy sessions to continue even when the amount of update data exceeds the copy destination capacity.
  SnapOPC+ is suitable for the following usages.

  - Making temporary backup for tape backup
  - Backup for less updated data (generation management is available)

- EC (Equivalent Copy)

  EC makes a mirror copy of the copy source to the copy destination beforehand, then suspends the copy and treats all data as independent data.
  When copying is Resumed, only updated data in the copy source is copied to the copy destination. If the copy destination data has been changed, copy the copy source data again.
  EC is suitable for the following usages.

  - Making backup
  - Making system test data replication

- REC (Remote Equivalent Copy)

  REC is used to copy data among multiple devices using the EC copy method.
  REC is suitable for the following usages.

  - Replicating system test datasets
  - Duplicating databases on multiple devices
  - Backing up data to remote devices

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Which copy functions and how many copy sessions are actually available will depend on the storage system model involved, whether or not a copy license has been purchased, and which license.

Table 1.9 shows the various copy functions that are available.

Table 1.10 shows the maximum number of copy sessions allowed.

Table 1.9 Available copy functions

License type	None			ETERNUS SF Snap/Clone License or Advanced Copy feature		
ETERNUS	DX60/DX80/DX90			DX60/DX80/DX90		
Controlling software	GUI CLI	VSS	ETERNUS SF Express	GUI CLI	VSS	ETERNUS SF Express
Available copy type	SnapOPC+	SnapOPC+, QuickOPC	SnapOPC+	SnapOPC+	SnapOPC+, QuickOPC	SnapOPC+, QuickOPC, OPC, EC

License type	ETERNUS SF AdvancedCopy Manager Local Copy License			ETERNUS SF Remote Copy License	ETERNUS SF AdvancedCopy Manager Remote Copy License
ETERNUS	DX60/DX80/DX90			DX90	DX90
Controlling software	GUI CLI	VSS	ETERNUS SF AdvancedCopy Manager	ETERNUS SF Express	ETERNUS SF AdvancedCopy Manager
Available copy type	SnapOPC+	SnapOPC+, QuickOPC	SnapOPC+, QuickOPC, OPC, EC	REC	REC

Table 1.10 Maximum number of copy sessions

License	None	Registered	
ETERNUS	DX60/DX80/DX90	DX60	DX80/DX90
Maximum number of copy sessions	8	512	1024

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1.3.4 RAID Migration

RAID migration is a function that transfers a volume to a different RAID group with the data integrity being guaranteed. By using RAID migration, RAID levels and volumes can be hot switched. This allows easy redistribution of volumes among RAID groups in response to customer needs. RAID migration can be carried out while the system is running, and may also be used to switch data to a different RAID level changing from RAID5 to RAID1+0, for example.

The example of RAID migration is as follows:

- Example when transferring volumes from a RAID5(3+1) 300GB disk configuration to a RAID5(3+1) 450GB disk configuration:

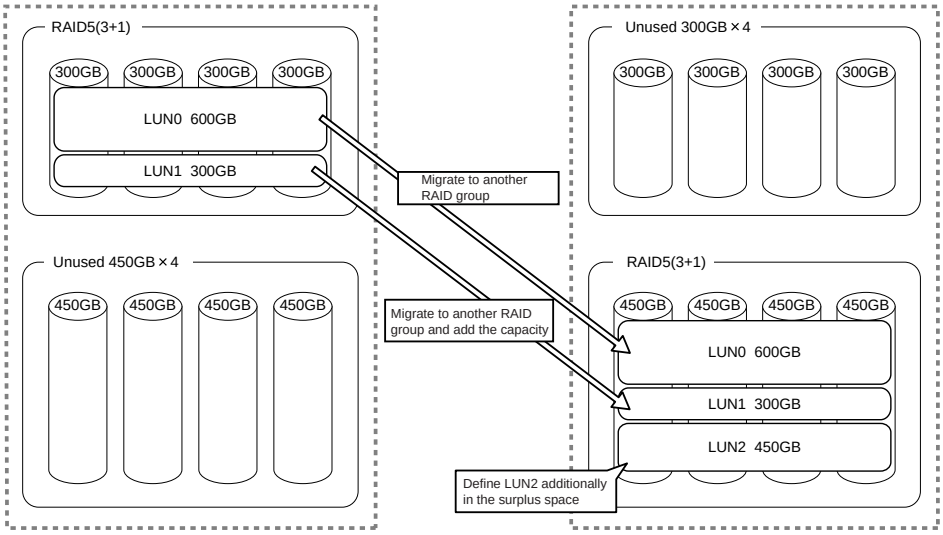

Figure 1.13 Example for use RAID Migration 1

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- Example when volumes transferred from a RAID5(3+1) configuration to a different RAID level, RAID1+0(3+3), configuration:

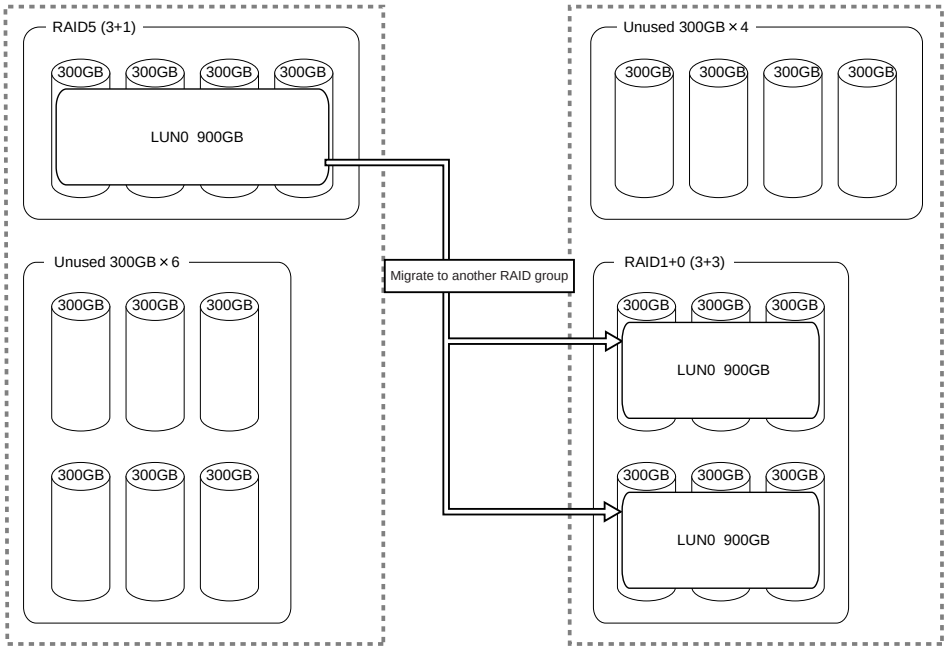

Figure 1.14 Example for use RAID Migration 2

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1.3.5 Logical Device Expansion

Logical Device Expansion (RAID Group Expansion) allows the capacity of an existing RAID group to be dynamically extended by the addition of extra disks. By using Logical Device Expansion to extend the capacity of existing RAID group in this way, new volume can be added without having to add new RAID groups, as used to be the case.

The following shows the example when RAID5(3+1) 300GB configuration converted to a RAID5(4+1) configuration by the addition of an extra disk.

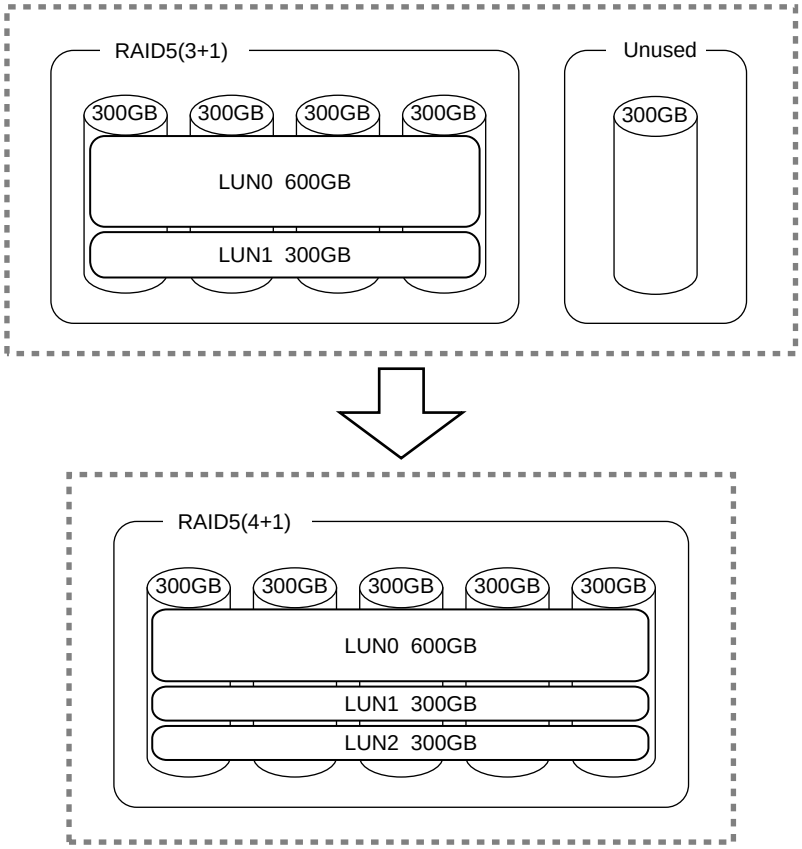

Figure 1.15 Example for use Logical Device Expansion

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1.3.6 LUN Concatenation

LUN concatenation is a function that is used to add new area to a volume and so expand the volume capacity available to the server. This function enables the reuse of leftover free area in a RAID group and can be used to solve capacity shortages.

The following example shows the concatenation of an unused area of a different RAID group into LUN2, in order to expand LUN2's capacity to 900GB.

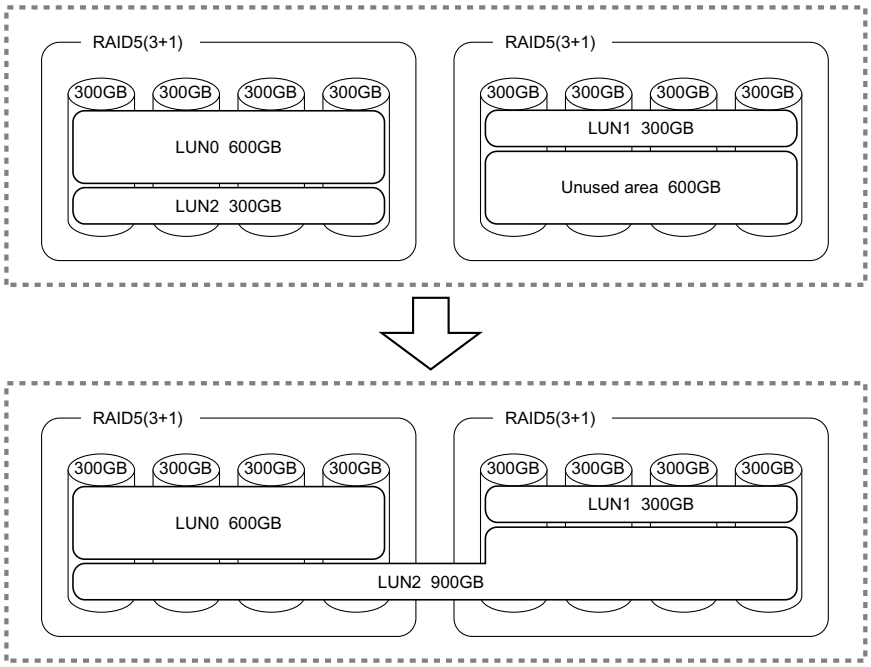

Figure 1.16 Example for use LUN Concatenation

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1.3.7 Security Functions

The ETERNUS DX60/DX80/DX90 possesses functions that allow numbers of volumes, that can be recognized by a server, to be expanded or restricted by adjusting how the logical units (LUN) seen by the host correspond to the volumes within the storage system.
"LUN mapping function" and "Host Affinity function" are available as security functions.

- LUN Mapping function

  LUN mapping is used to set the relationship between the logical units (LUN) of the host and the volumes of the device, on a per device port basis.

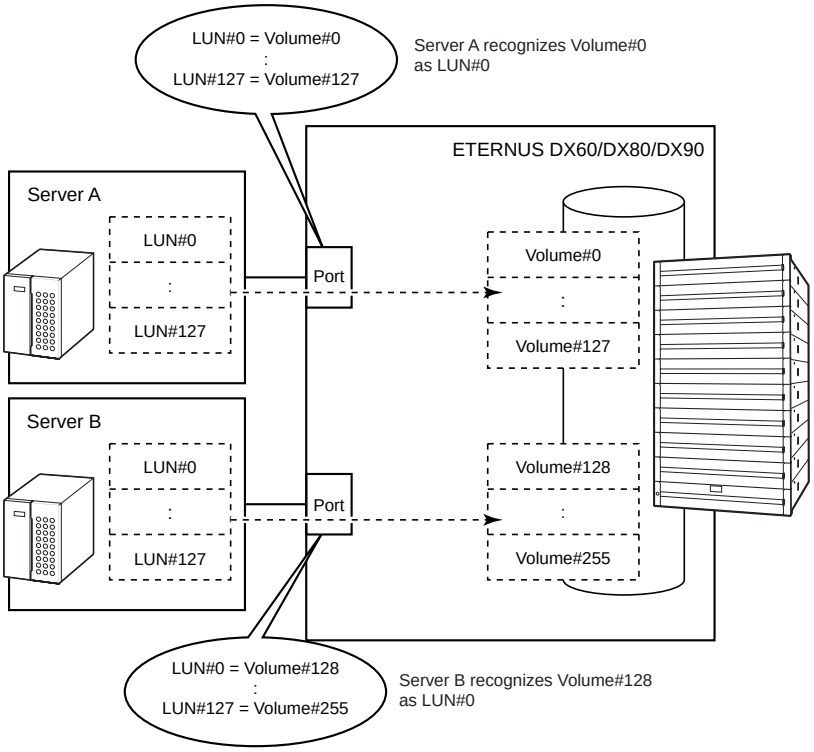

Figure 1.17 LUN Mapping function

By specifying different LUN mapping per port, it is possible to set the volumes that can be accessed for each server.

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- Host Affinity function

  The Host Affinity function sets the "Affinity Group" to be applied for each server. "Affinity Group" defines the relationship between the host logical units (LUN) and the device logical volumes. Multiple settings are available.
  The Host Affinity function uses the server's World Wide Name (WWN), iSCSI name, or SAS address to distinguish it from other servers.

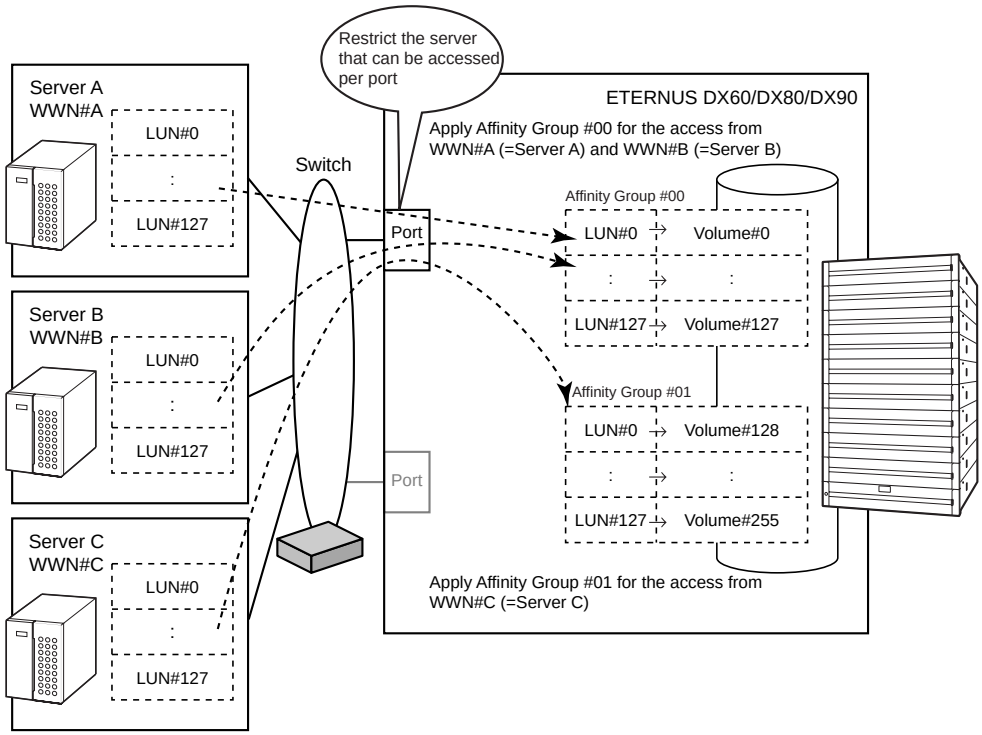

Figure 1.18 Host Affinity function

When multiple servers access the device using the same port, this assigns Affinity Group for each server.

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1.3.8 Eco-mode

Using Eco-mode allows the spindle rotation of the disk to be stopped for specified periods to reduce power consumption. Disk spin-up and spin-down schedules can be set for each RAID group, and can also be set to allow backup operations.

The following shows the Eco-mode mechanism.

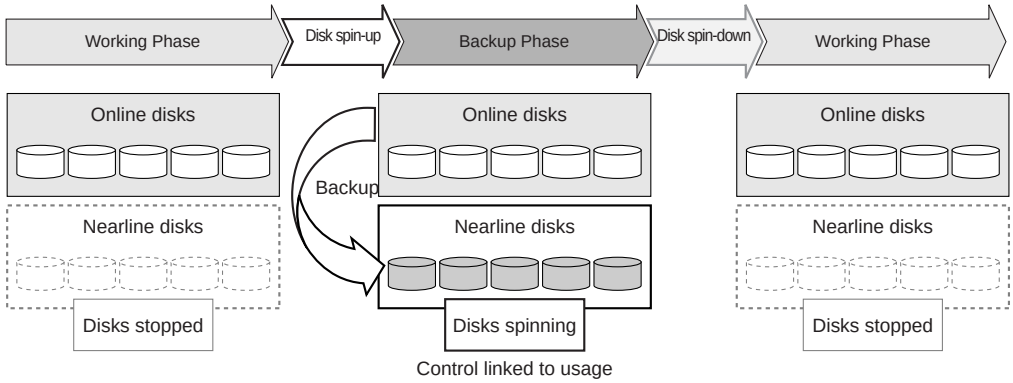

Figure 1.19 Eco-mode mechanism

The following shows an Eco-mode backup scheduling example.

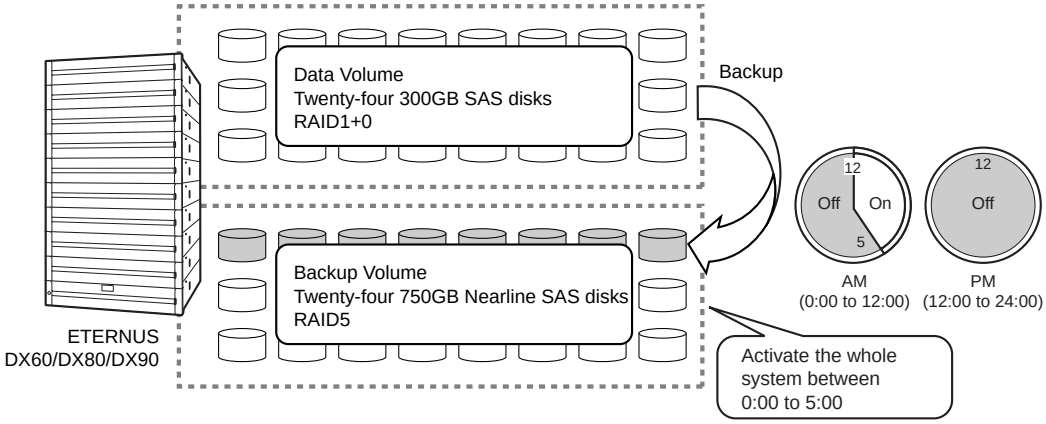

Figure 1.20 Setting example for Eco-mode schedule

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Chapter 2 Components

This chapter describes the components of the various form factors.

2.1 3.5" Type Controller Enclosure

The 3.5" type controller enclosure contains 3.5" disks installed in the front, and controller modules and power supply units (with fans) in the rear.

2.1.1 Front View

- With front cover

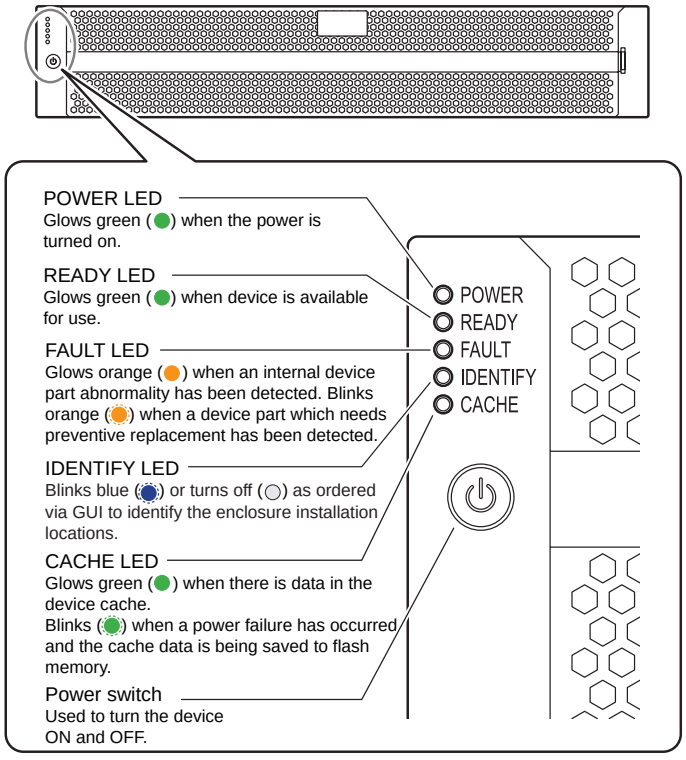
POWER LED
Glows green (●) when the power is turned on.
READY LED
Glows green (●) when device is available for use.
FAULT LED
Glows orange (●) when an internal device part abnormality has been detected. Blinks orange (●) when a device part which needs preventive replacement has been detected.
IDENTIFY LED
Blinks blue (●) or turns off (○) as ordered via GUI to identify the enclosure installation locations.
CACHE LED
Glows green (●) when there is data in the device cache.
Blinks (●) when a power failure has occurred and the cache data is being saved to flash memory.
Power switch
Used to turn the device ON and OFF.
POWER
READY
FAULT
IDENTIFY
CACHE

Figure 2.1 Front view of 3.5" type controller enclosure (with front cover)

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Without front cover

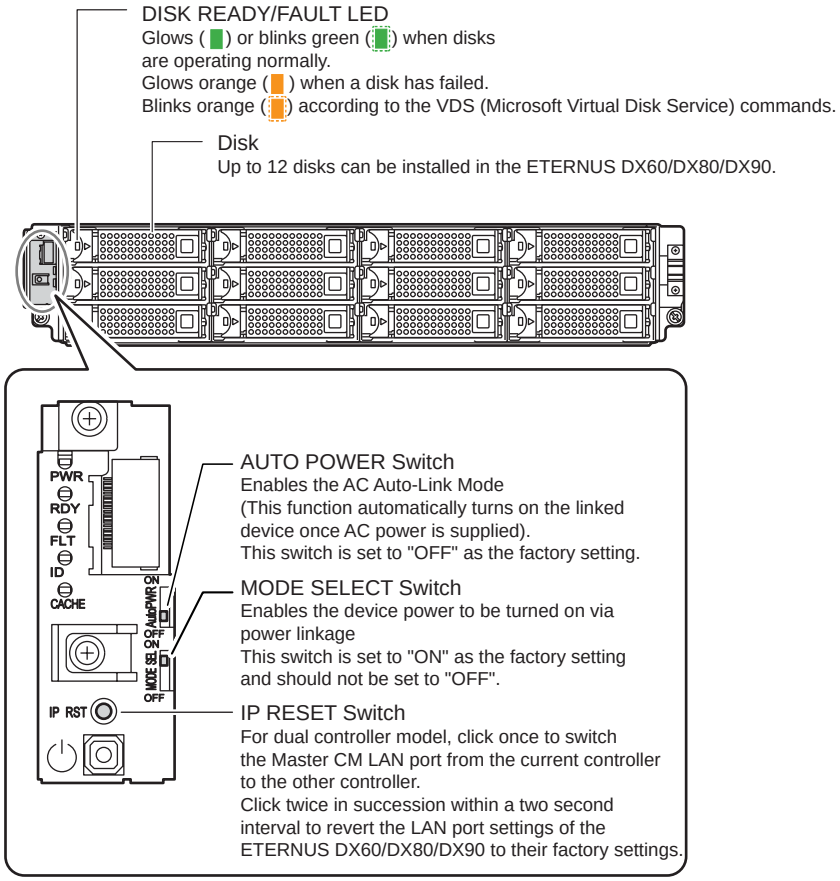
DISK READY/FAULT LED
Glows ( ) or blinks green ( ) when disks are operating normally.
Glows orange ( ) when a disk has failed.
Blinks orange ( ) according to the VDS (Microsoft Virtual Disk Service) commands.
Disk
Up to 12 disks can be installed in the ETERNUS DX60/DX80/DX90.
PWR
RDY
FLT
ID
CACHE
ON
AutoPWR
OFF
ON
MODE SEL
OFF
IP RST
AUTO POWER Switch
Enables the AC Auto-Link Mode
(This function automatically turns on the linked device once AC power is supplied).
This switch is set to "OFF" as the factory setting.
MODE SELECT Switch
Enables the device power to be turned on via power linkage
This switch is set to "ON" as the factory setting and should not be set to "OFF".
IP RESET Switch
For dual controller model, click once to switch the Master CM LAN port from the current controller to the other controller.
Click twice in succession within a two second interval to revert the LAN port settings of the ETERNUS DX60/DX80/DX90 to their factory settings.

Figure 2.2 Front view of 3.5" type controller enclosure (without front cover)

Disk slot numbers

Figure 2.3 shows the slot number of each disk.

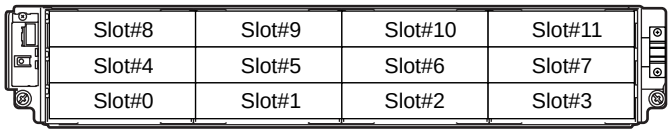

Figure 2.3 Disk slot numbers (3.5" type controller enclosure)

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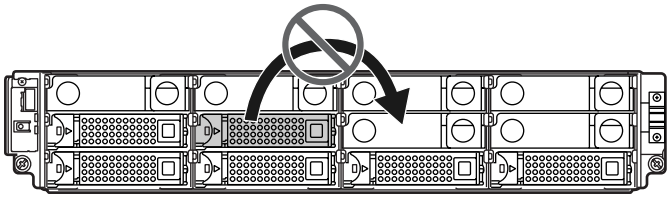
CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



2.1.2 Rear View

Single controller model

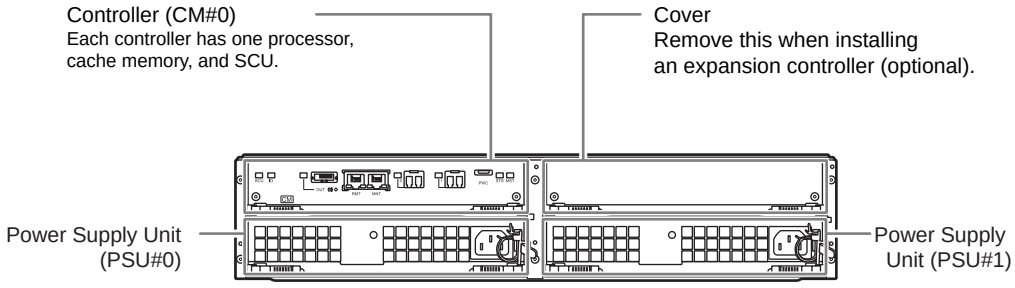

Controller (CM#0)
Each controller has one processor, cache memory, and SCU.
Cover
Remove this when installing an expansion controller (optional).
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)

Figure 2.4 Rear view of 3.5" type controller enclosure (single controller model)

Dual controller model

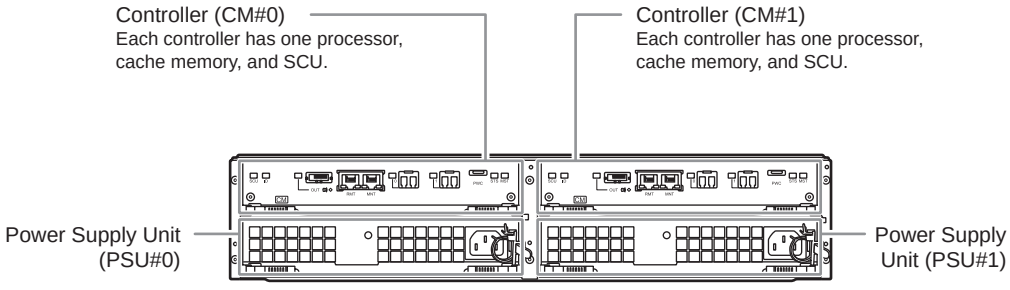

Controller (CM#0)
Each controller has one processor, cache memory, and SCU.
Controller (CM#1)
Each controller has one processor, cache memory, and SCU.
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)

Figure 2.5 Rear view of 3.5" type controller enclosure (dual controller model)

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Controller (CM)

- ETERNUS DX60/DX80 Fibre Channel model

  Figure 2.6 shows the ETERNUS DX60/DX80 Fibre Channel model controller.

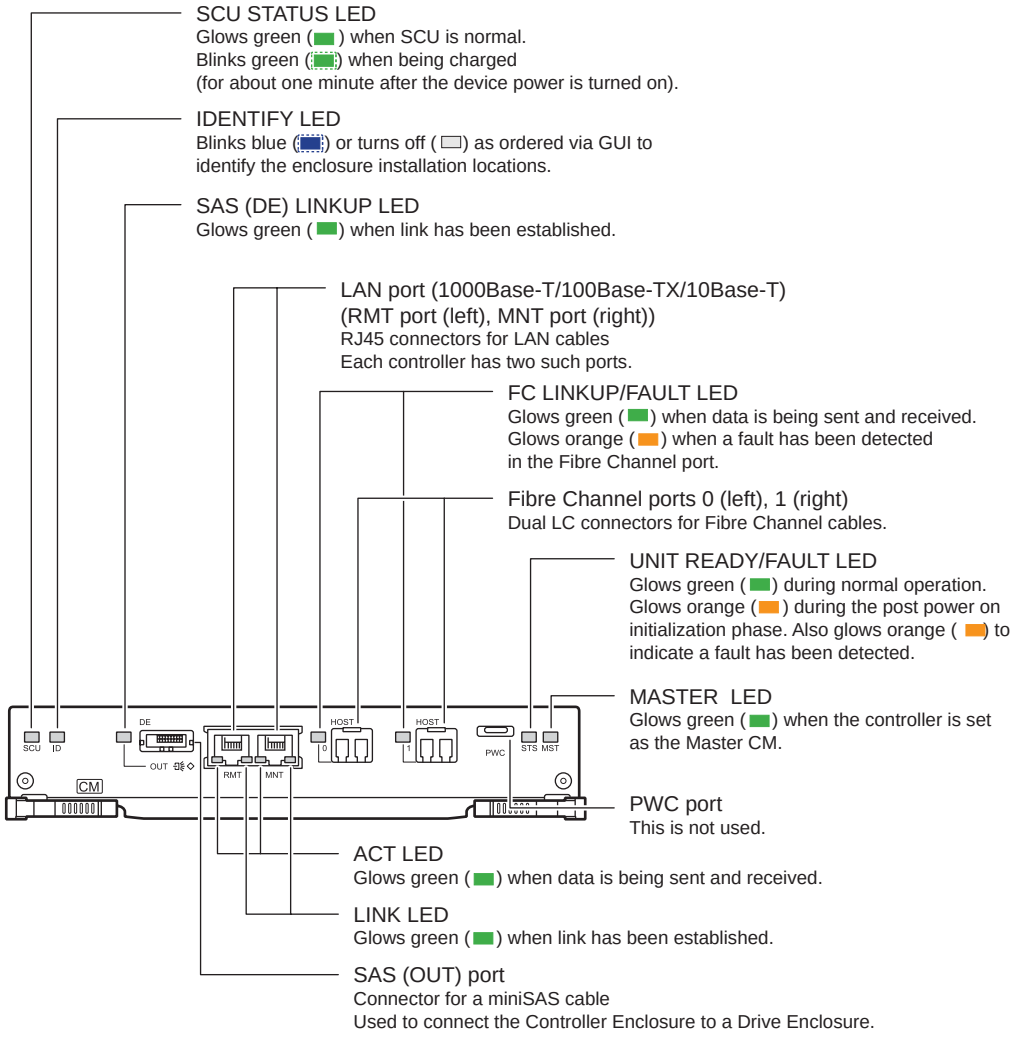
SCU STATUS LED
Glows green ( ) when SCU is normal.
Blinks green ( ) when being charged
(for about one minute after the device power is turned on).
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to
identify the enclosure installation locations.
SAS (DE) LINKUP LED
Glows green ( ) when link has been established.
LAN port (1000Base-T/100Base-TX/10Base-T)
(RMT port (left), MNT port (right))
RJ45 connectors for LAN cables
Each controller has two such ports.
FC LINKUP/FAULT LED
Glows green ( ) when data is being sent and received.
Glows orange ( ) when a fault has been detected
in the Fibre Channel port.
Fibre Channel ports 0 (left), 1 (right)
Dual LC connectors for Fibre Channel cables.
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on
initialization phase. Also glows orange ( ) to
indicate a fault has been detected.
MASTER LED
Glows green ( ) when the controller is set
as the Master CM.
PWC port
This is not used.
ACT LED
Glows green ( ) when data is being sent and received.
LINK LED
Glows green ( ) when link has been established.
SAS (OUT) port
Connector for a miniSAS cable
Used to connect the Controller Enclosure to a Drive Enclosure.
SCU
ID
DE
OUT
RMT
MNT
HOST
0
HOST
1
PWC
STS
MST
CM

Figure 2.6 ETERNUS DX60/DX80 Fibre Channel model controller

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- ETERNUS DX90 Fibre Channel model

  Figure 2.7 shows the ETERNUS DX90 Fibre Channel model controller.

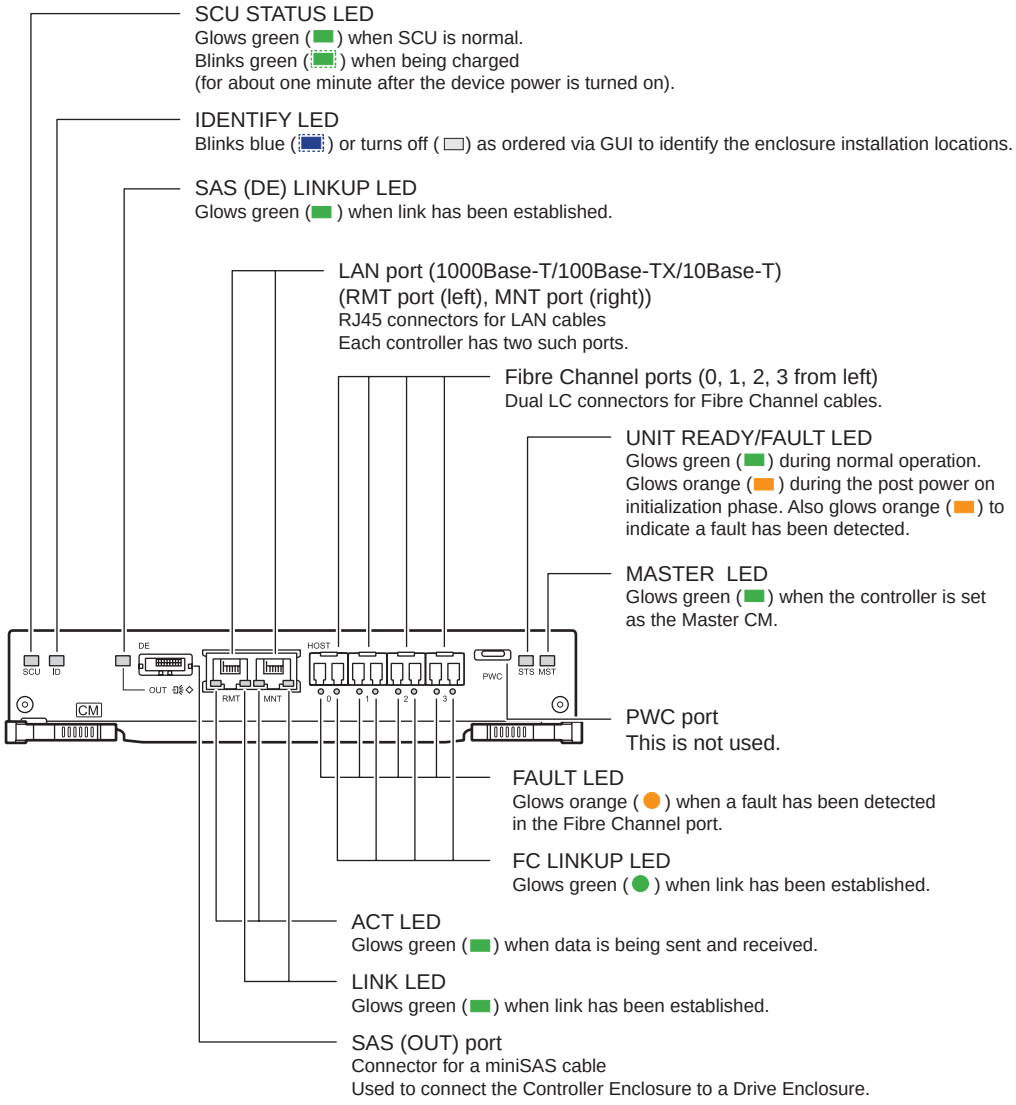
SCU STATUS LED
Glows green ( ) when SCU is normal.
Blinks green ( ) when being charged
(for about one minute after the device power is turned on).
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
SAS (DE) LINKUP LED
Glows green ( ) when link has been established.
LAN port (1000Base-T/100Base-TX/10Base-T)
(RMT port (left), MNT port (right))
RJ45 connectors for LAN cables
Each controller has two such ports.
Fibre Channel ports (0, 1, 2, 3 from left)
Dual LC connectors for Fibre Channel cables.
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on initialization phase. Also glows orange ( ) to indicate a fault has been detected.
MASTER LED
Glows green ( ) when the controller is set as the Master CM.
PWC port
This is not used.
FAULT LED
Glows orange ( ) when a fault has been detected in the Fibre Channel port.
FC LINKUP LED
Glows green ( ) when link has been established.
ACT LED
Glows green ( ) when data is being sent and received.
LINK LED
Glows green ( ) when link has been established.
SAS (OUT) port
Connector for a miniSAS cable
Used to connect the Controller Enclosure to a Drive Enclosure.
SCU
ID
DE
OUT
HOST
RMT
MNT
PWC
STS
MST
CM

Figure 2.7 ETERNUS DX90 Fibre Channel model controller

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- ETERNUS DX60/DX80 iSCSI model

  Figure 2.8 shows the ETERNUS DX60/DX80 iSCSI model controller.

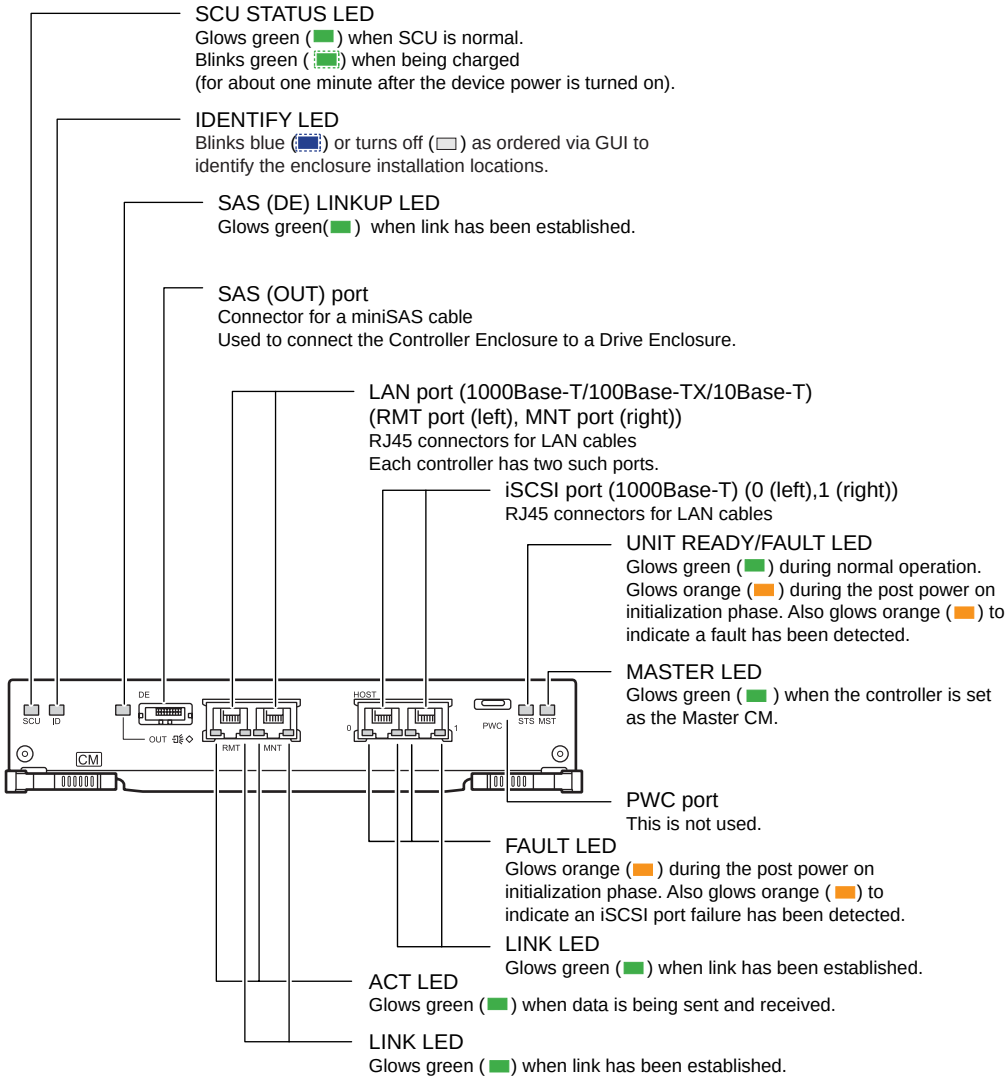
SCU STATUS LED
Glows green ( ) when SCU is normal.
Blinks green ( ) when being charged
(for about one minute after the device power is turned on).
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
SAS (DE) LINKUP LED
Glows green( ) when link has been established.
SAS (OUT) port
Connector for a miniSAS cable
Used to connect the Controller Enclosure to a Drive Enclosure.
LAN port (1000Base-T/100Base-TX/10Base-T)
(RMT port (left), MNT port (right))
RJ45 connectors for LAN cables
Each controller has two such ports.
iSCSI port (1000Base-T) (0 (left),1 (right))
RJ45 connectors for LAN cables
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on initialization phase. Also glows orange ( ) to indicate a fault has been detected.
MASTER LED
Glows green ( ) when the controller is set as the Master CM.
PWC port
This is not used.
FAULT LED
Glows orange ( ) during the post power on initialization phase. Also glows orange ( ) to indicate an iSCSI port failure has been detected.
LINK LED
Glows green ( ) when link has been established.
ACT LED
Glows green ( ) when data is being sent and received.
LINK LED
Glows green ( ) when link has been established.
SCU
ID
DE
OUT
RMT
MNT
HOST
PWC
STS
MST
CM

Figure 2.8 ETERNUS DX60/DX80 iSCSI model controller

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- ETERNUS DX60/DX80 SAS model

  Figure 2.9 shows the ETERNUS DX60/DX80 SAS model controller.

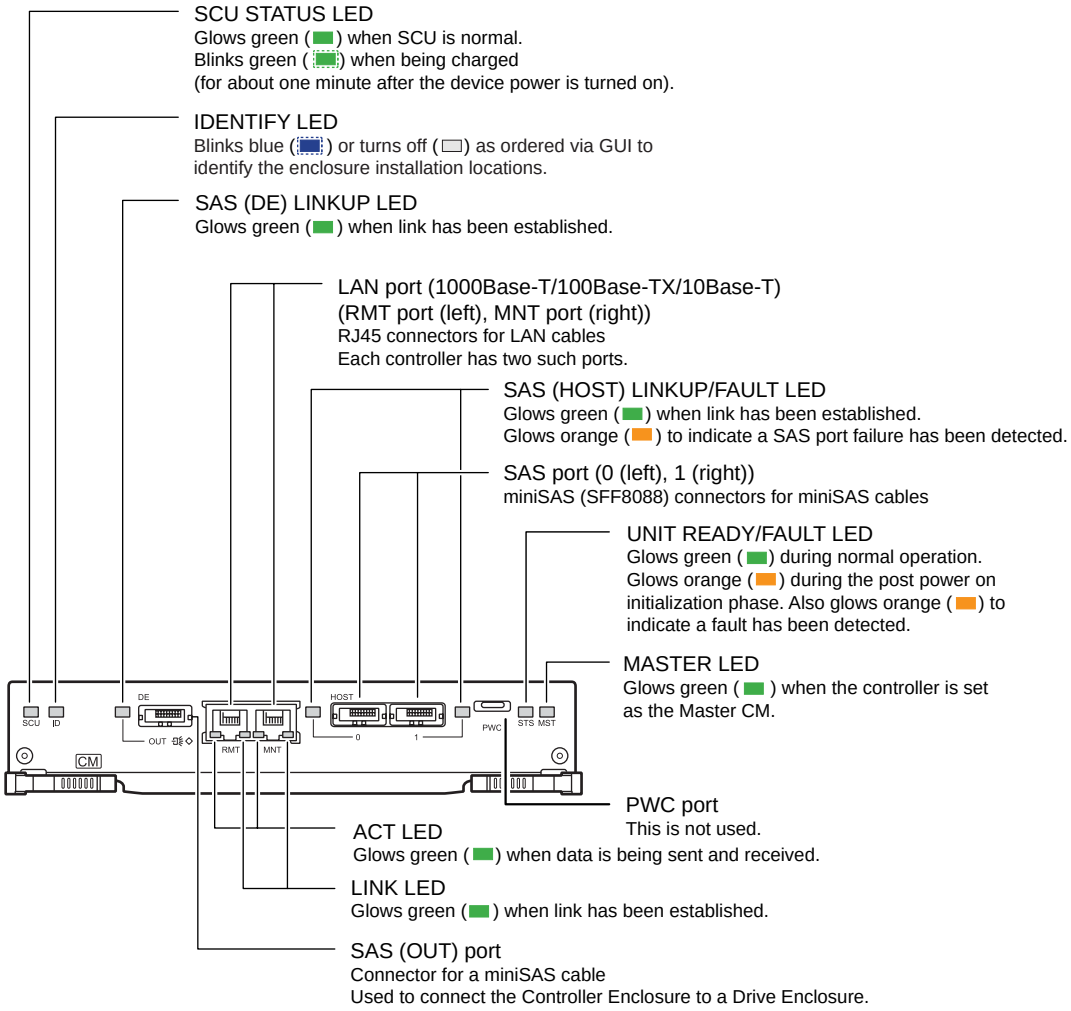
SCU STATUS LED
Glows green ( ) when SCU is normal.
Blinks green ( ) when being charged
(for about one minute after the device power is turned on).
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
SAS (DE) LINKUP LED
Glows green ( ) when link has been established.
LAN port (1000Base-T/100Base-TX/10Base-T)
(RMT port (left), MNT port (right))
RJ45 connectors for LAN cables
Each controller has two such ports.
SAS (HOST) LINKUP/FAULT LED
Glows green ( ) when link has been established.
Glows orange ( ) to indicate a SAS port failure has been detected.
SAS port (0 (left), 1 (right))
miniSAS (SFF8088) connectors for miniSAS cables
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on initialization phase. Also glows orange ( ) to indicate a fault has been detected.
MASTER LED
Glows green ( ) when the controller is set as the Master CM.
PWC port
This is not used.
ACT LED
Glows green ( ) when data is being sent and received.
LINK LED
Glows green ( ) when link has been established.
SAS (OUT) port
Connector for a miniSAS cable
Used to connect the Controller Enclosure to a Drive Enclosure.
SCU
ID
DE
OUT
RMT
MNT
HOST
0
1
PWC
STS
MST
CM

Figure 2.9 ETERNUS DX60/DX80 SAS model controller

System Capacitor Unit (SCU)

An SCU is installed in the controller as a backup power source in case of power outage.

IMPORTANT

- If a power failure lasts for more than 20ms, the SCU starts supplying power, and the controller's cache data is copied to flash memory. There is no limit to the post-failure data retention time.
- SCU failure will disable the cache function, leading to degraded performance.

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Power supply unit

Figure 2.10 shows the power supply unit.

Note

Each power supply unit has two internal cooling fans.

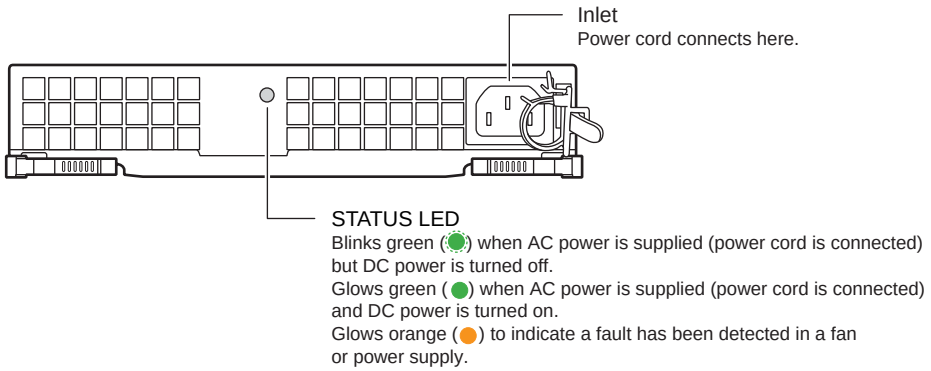
Inlet
Power cord connects here.
STATUS LED
Blinks green (●) when AC power is supplied (power cord is connected) but DC power is turned off.
Glows green (●) when AC power is supplied (power cord is connected) and DC power is turned on.
Glows orange (●) to indicate a fault has been detected in a fan or power supply.

Figure 2.10 Power supply unit (3.5" type controller enclosure)

IMPORTANT

- Each enclosure has two power supply units (PSU#0 and PSU#1). The power cords must be connected to the inlets of both power supply units.
- Power cords should not be reconnected immediately after being disconnected. Always wait for the power supply unit's STATUS LED to completely turn off (about 10 seconds) before reconnecting a disconnected power cord.

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2.2 2.5" Type Controller Enclosure

The 2.5" type controller enclosure contains 2.5" disks installed in the front, and controller modules and power supply units (with fans) in the rear.

2.2.1 Front View

With flange cover

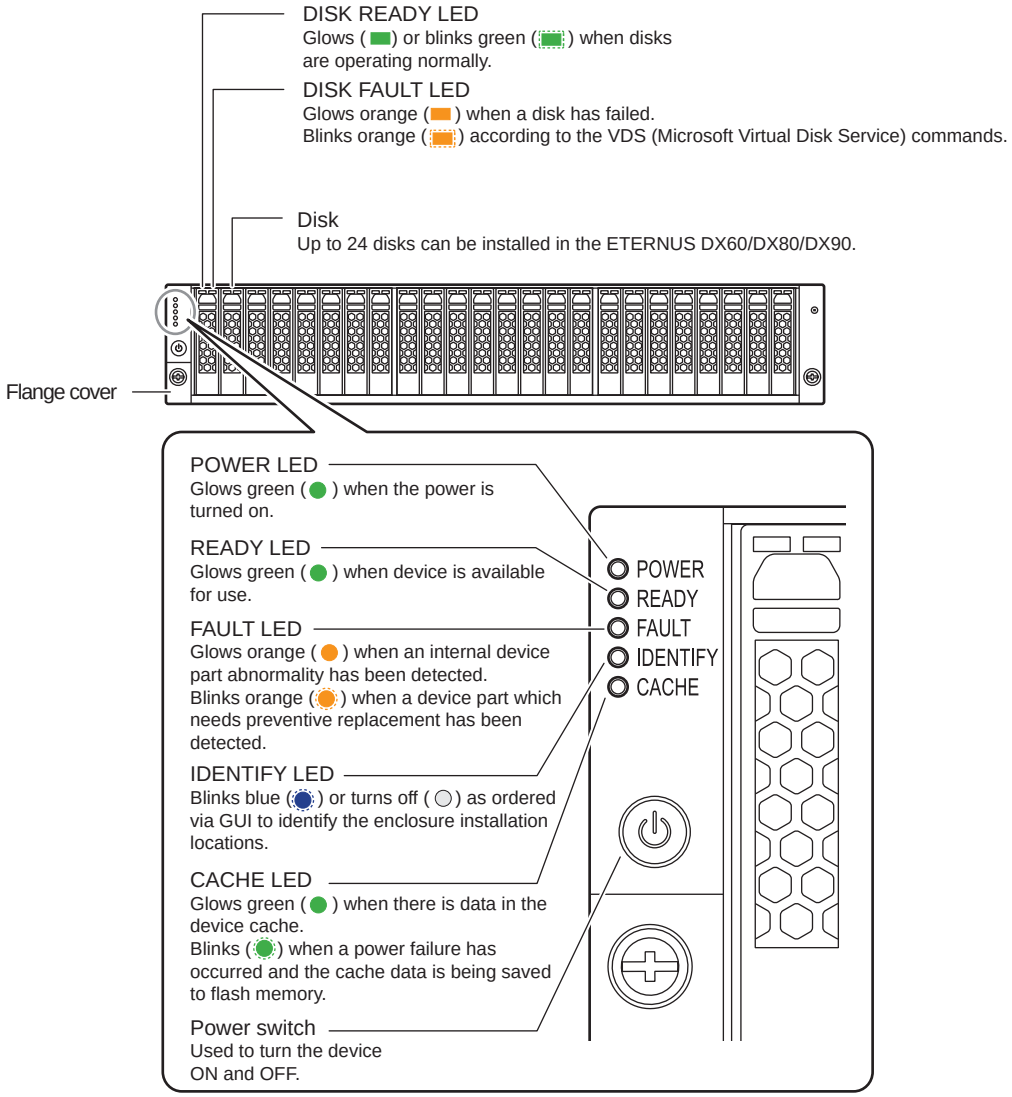
DISK READY LED
Glows ( ) or blinks green ( ) when disks are operating normally.
DISK FAULT LED
Glows orange ( ) when a disk has failed.
Blinks orange ( ) according to the VDS (Microsoft Virtual Disk Service) commands.
Disk
Up to 24 disks can be installed in the ETERNUS DX60/DX80/DX90.
Flange cover
POWER LED
Glows green ( ) when the power is turned on.
READY LED
Glows green ( ) when device is available for use.
FAULT LED
Glows orange ( ) when an internal device part abnormality has been detected.
Blinks orange ( ) when a device part which needs preventive replacement has been detected.
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
CACHE LED
Glows green ( ) when there is data in the device cache.
Blinks ( ) when a power failure has occurred and the cache data is being saved to flash memory.
Power switch
Used to turn the device ON and OFF.
POWER
READY
FAULT
IDENTIFY
CACHE

Figure 2.11 Front view of 2.5" type controller enclosure (with flange cover)

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Without flange cover

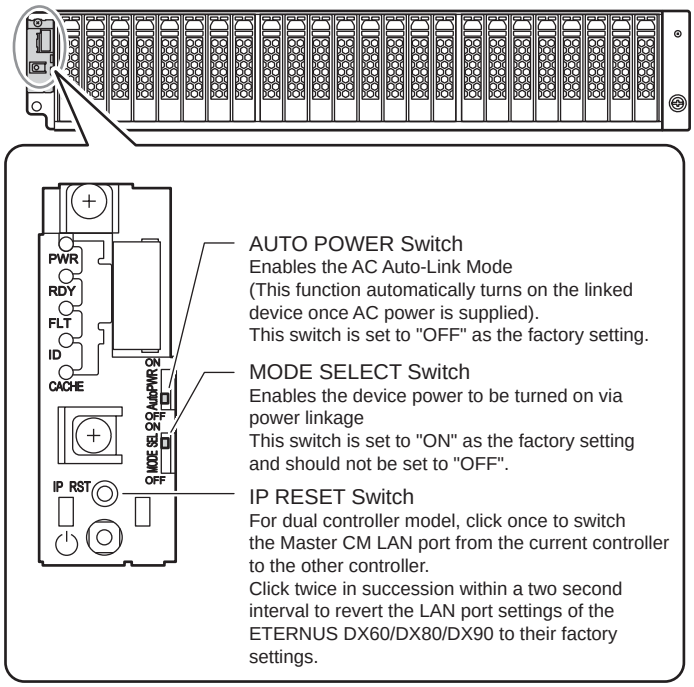

PWR
RDY
FLT
ID
CACHE
ON
Auto PWR
OFF
ON
MODE SEL
OFF
IP RST
AUTO POWER Switch
Enables the AC Auto-Link Mode
(This function automatically turns on the linked device once AC power is supplied).
This switch is set to "OFF" as the factory setting.
MODE SELECT Switch
Enables the device power to be turned on via power linkage
This switch is set to "ON" as the factory setting and should not be set to "OFF".
IP RESET Switch
For dual controller model, click once to switch the Master CM LAN port from the current controller to the other controller.
Click twice in succession within a two second interval to revert the LAN port settings of the ETERNUS DX60/DX80/DX90 to their factory settings.

Figure 2.12 Front view of 2.5" type controller enclosure (without flange cover)

Disk slot numbers

Figure 2.13 shows the slot number of each disk.

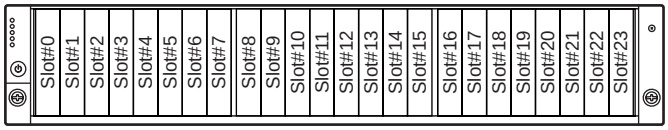
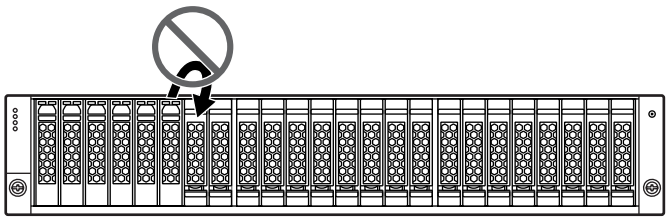


Figure 2.13 Disk slot numbers (2.5" type controller enclosure)

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



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2.2.2 Rear View

Single controller model

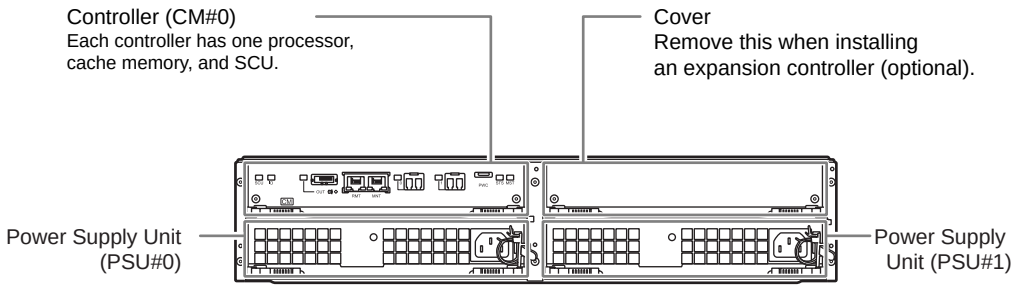
Controller (CM#0)
Each controller has one processor, cache memory, and SCU.
Cover
Remove this when installing an expansion controller (optional).
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)

Figure 2.14 Rear view of 2.5" type controller enclosure (single controller model)

Dual controller model

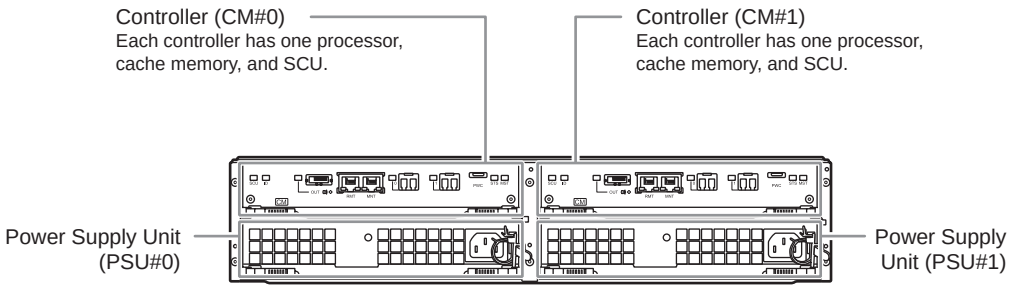
Controller (CM#0)
Each controller has one processor, cache memory, and SCU.
Controller (CM#1)
Each controller has one processor, cache memory, and SCU.
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)

Figure 2.15 Rear view of 2.5" type controller enclosure (dual controller model)

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Controller (CM)

- ETERNUS DX60/DX80 Fibre Channel type

  Figure 2.16 shows the ETERNUS DX60/DX80 Fibre Channel model controller.

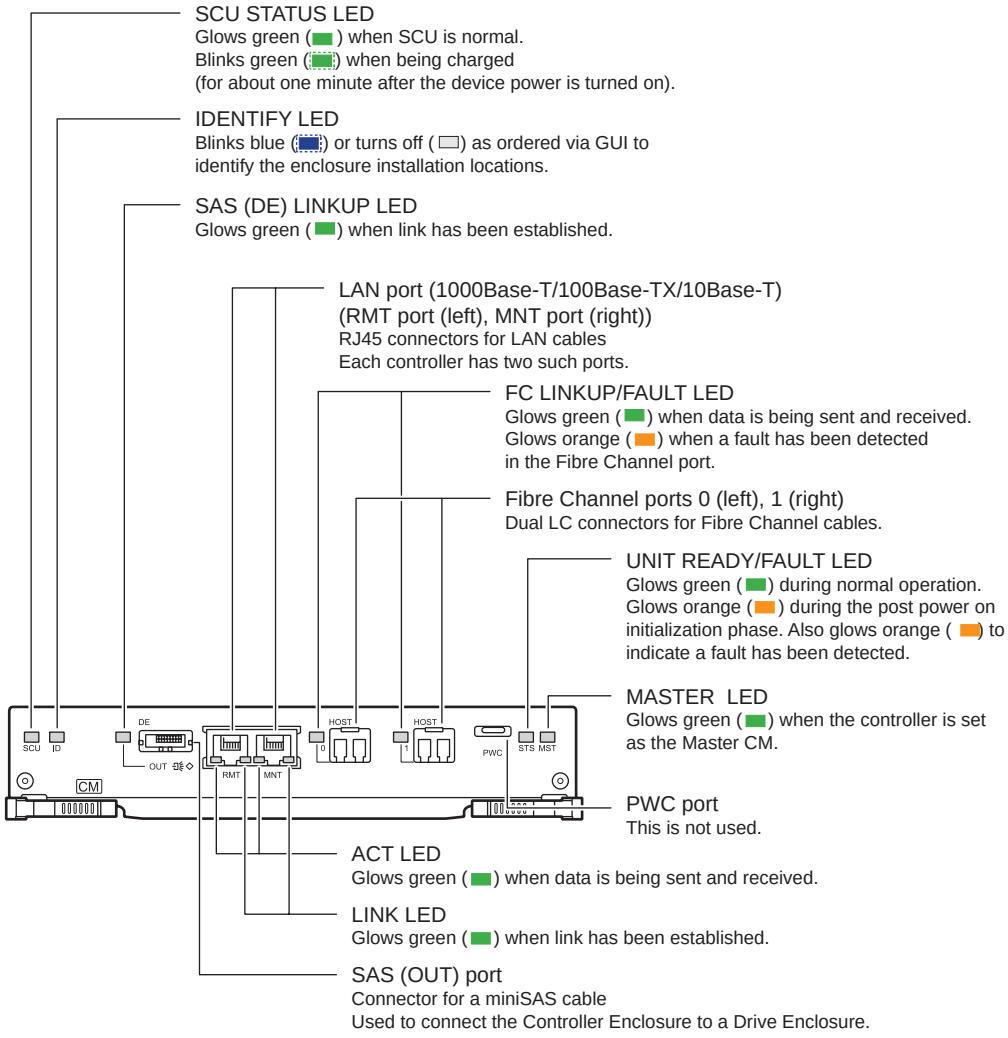
SCU STATUS LED
Glows green ( ) when SCU is normal.
Blinks green ( ) when being charged
(for about one minute after the device power is turned on).
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to
identify the enclosure installation locations.
SAS (DE) LINKUP LED
Glows green ( ) when link has been established.
LAN port (1000Base-T/100Base-TX/10Base-T)
(RMT port (left), MNT port (right))
RJ45 connectors for LAN cables
Each controller has two such ports.
FC LINKUP/FAULT LED
Glows green ( ) when data is being sent and received.
Glows orange ( ) when a fault has been detected
in the Fibre Channel port.
Fibre Channel ports 0 (left), 1 (right)
Dual LC connectors for Fibre Channel cables.
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on
initialization phase. Also glows orange ( ) to
indicate a fault has been detected.
MASTER LED
Glows green ( ) when the controller is set
as the Master CM.
PWC port
This is not used.
ACT LED
Glows green ( ) when data is being sent and received.
LINK LED
Glows green ( ) when link has been established.
SAS (OUT) port
Connector for a miniSAS cable
Used to connect the Controller Enclosure to a Drive Enclosure.
SCU
ID
DE
OUT
RMT
MNT
HOST
HOST
PWC
STS
MST
CM

Figure 2.16 ETERNUS DX60/DX80 Fibre Channel model controller

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- ETERNUS DX90 Fibre Channel model

  Figure 2.17 shows the ETERNUS DX90 Fibre Channel model controller.

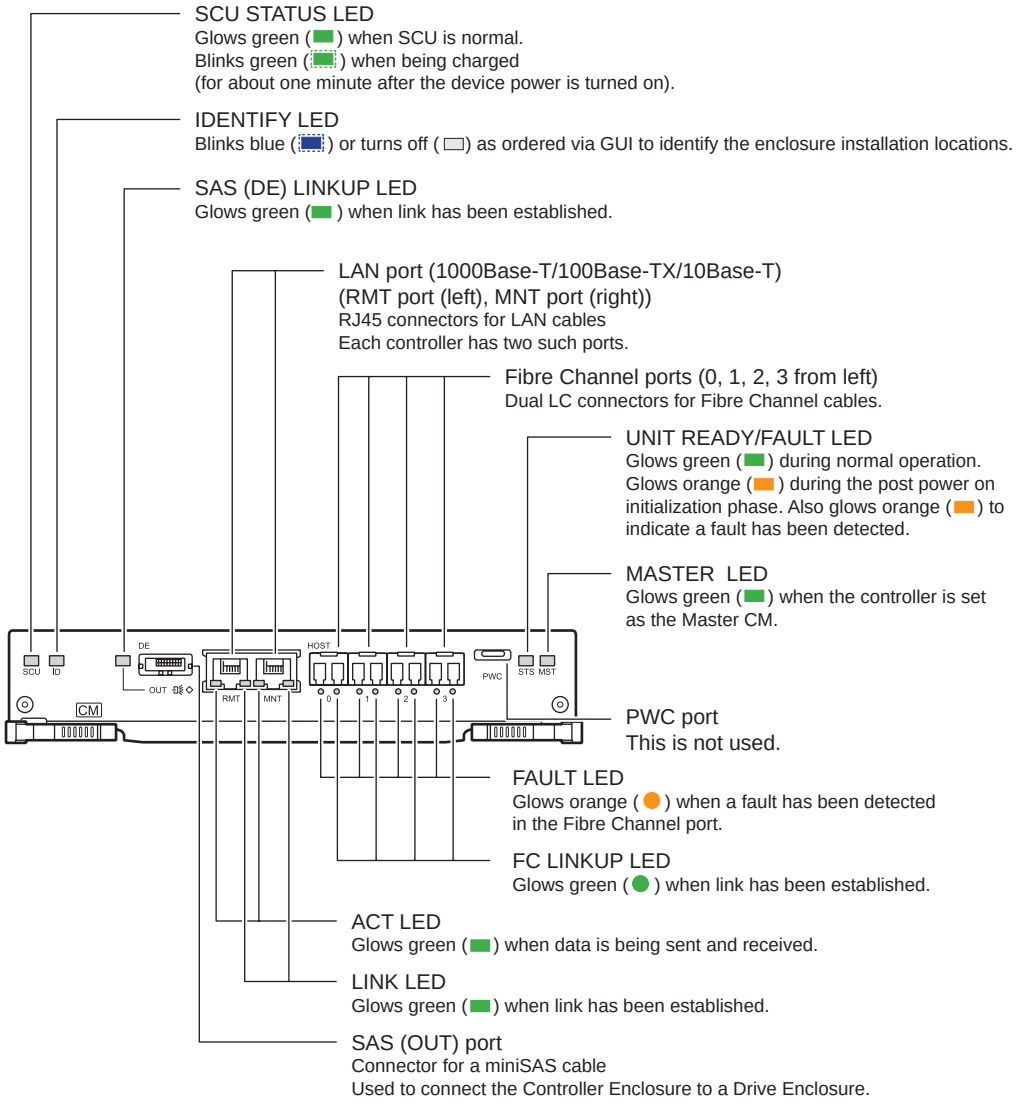
SCU STATUS LED
Glows green ( ) when SCU is normal.
Blinks green ( ) when being charged
(for about one minute after the device power is turned on).
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
SAS (DE) LINKUP LED
Glows green ( ) when link has been established.
LAN port (1000Base-T/100Base-TX/10Base-T)
(RMT port (left), MNT port (right))
RJ45 connectors for LAN cables
Each controller has two such ports.
Fibre Channel ports (0, 1, 2, 3 from left)
Dual LC connectors for Fibre Channel cables.
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on initialization phase. Also glows orange ( ) to indicate a fault has been detected.
MASTER LED
Glows green ( ) when the controller is set as the Master CM.
PWC port
This is not used.
FAULT LED
Glows orange ( ) when a fault has been detected in the Fibre Channel port.
FC LINKUP LED
Glows green ( ) when link has been established.
ACT LED
Glows green ( ) when data is being sent and received.
LINK LED
Glows green ( ) when link has been established.
SAS (OUT) port
Connector for a miniSAS cable
Used to connect the Controller Enclosure to a Drive Enclosure.
SCU
ID
DE
OUT
HOST
RMT
MNT
PWC
STS
MST
CM

Figure 2.17 ETERNUS DX90 Fibre Channel model controller

System Capacitor Unit (SCU)

An SCU is installed in the controller as a backup power source in case of power outage.

IMPORTANT

- If a power failure lasts for more than 20ms, the SCU starts supplying power, and the controller's cache data is copied to flash memory. There is no limit to the post-failure data retention time.
- SCU failure will disable the cache function, leading to degraded performance.

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Power supply unit

Figure 2.18 shows the power supply unit.

Note

Each power supply unit has two internal cooling fans.

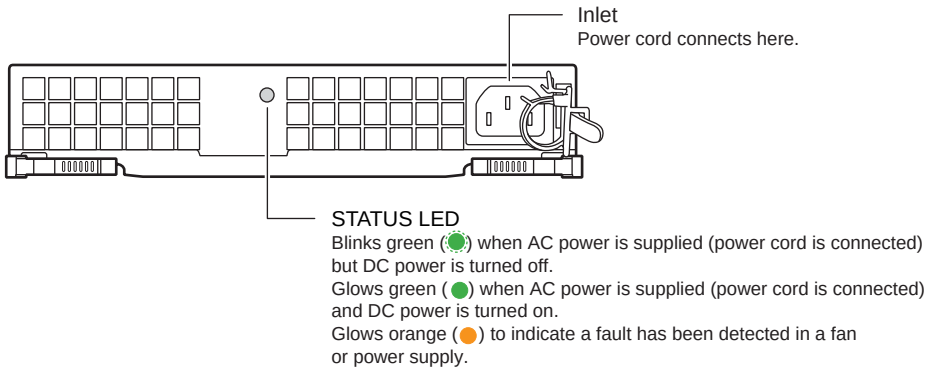
Inlet
Power cord connects here.
STATUS LED
Blinks green (●) when AC power is supplied (power cord is connected) but DC power is turned off.
Glows green (●) when AC power is supplied (power cord is connected) and DC power is turned on.
Glows orange (●) to indicate a fault has been detected in a fan or power supply.

Figure 2.18 Power supply unit (2.5" type controller enclosure)

IMPORTANT

- Each enclosure has two power supply units (PSU#0 and PSU#1). The power cords must be connected to the inlets of both power supply units.
- Power cords should not be reconnected immediately after being disconnected. Always wait for the power supply unit's STATUS LED to completely turn off (about 10 seconds) before reconnecting a disconnected power cord.

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2.3 3.5" Type Drive Enclosure

3.5" type drive enclosures contain 3.5" disks installed in the front, and expanders and power supply units (with fans) in the rear.

2.3.1 Front View

- With front cover

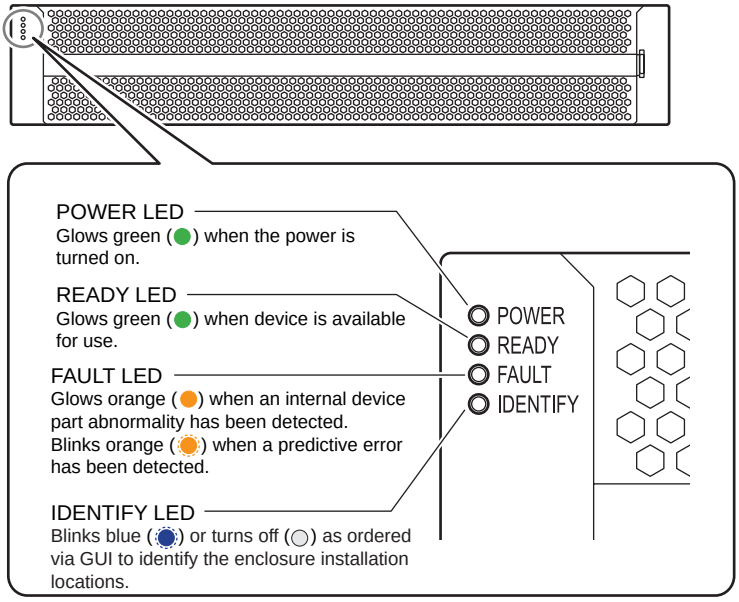
POWER LED
Glows green (●) when the power is turned on.
READY LED
Glows green (●) when device is available for use.
FAULT LED
Glows orange (●) when an internal device part abnormality has been detected.
Blinks orange (●) when a predictive error has been detected.
IDENTIFY LED
Blinks blue (●) or turns off (○) as ordered via GUI to identify the enclosure installation locations.
POWER
READY
FAULT
IDENTIFY

Figure 2.19 Front view of 3.5" type drive enclosure (with front cover)

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Without front cover

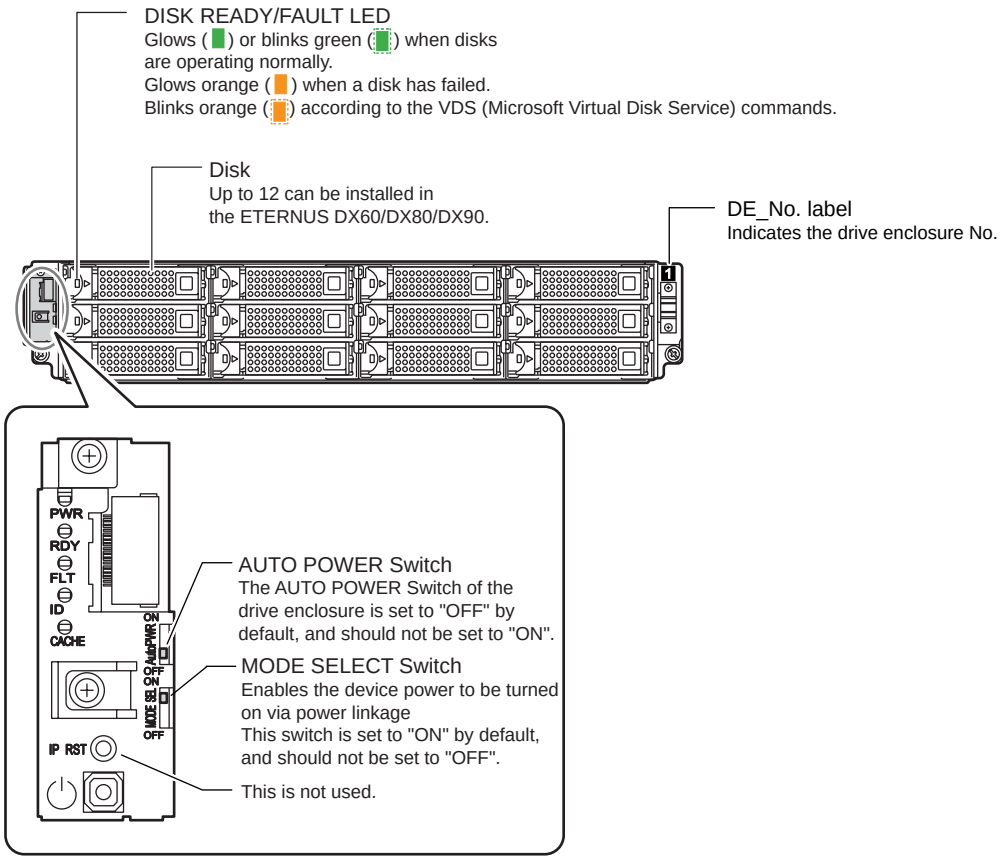
DISK READY/FAULT LED
Glows ( ) or blinks green ( ) when disks are operating normally.
Glows orange ( ) when a disk has failed.
Blinks orange ( ) according to the VDS (Microsoft Virtual Disk Service) commands.
Disk
Up to 12 can be installed in the ETERNUS DX60/DX80/DX90.
DE_No. label
Indicates the drive enclosure No.
PWR
RDY
FLT
ID
CACHE
AUTO PWR
MODE SEL
ON
OFF
IP RST
AUTO POWER Switch
The AUTO POWER Switch of the drive enclosure is set to "OFF" by default, and should not be set to "ON".
MODE SELECT Switch
Enables the device power to be turned on via power linkage
This switch is set to "ON" by default, and should not be set to "OFF".
This is not used.

Figure 2.20 Front view of 3.5" type drive enclosure (without front cover)

Disk slot numbers

Figure 2.21 shows the slot numbers of the disks in the drive enclosure.

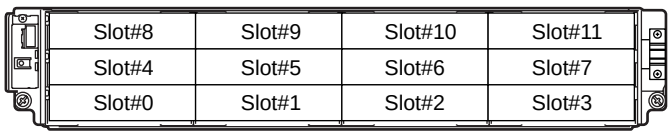

Figure 2.21 Disk slot numbers of 3.5" type drive enclosure

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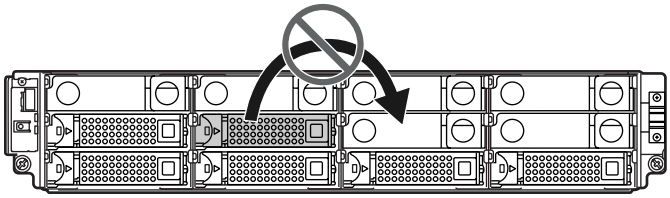
CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



2.3.2 Rear View

Single expander model

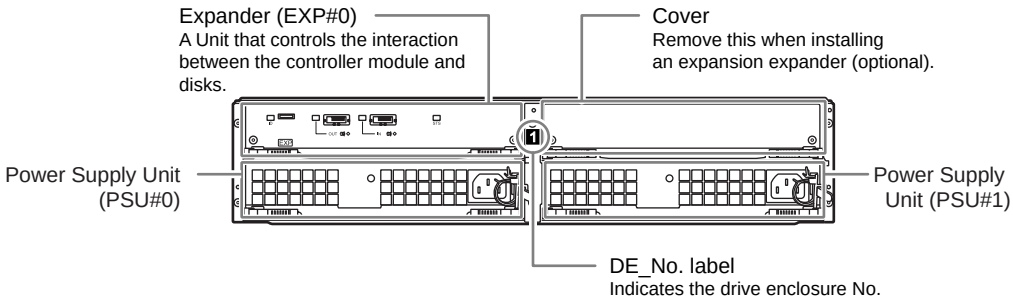

Expander (EXP#0)
A Unit that controls the interaction between the controller module and disks.
Cover
Remove this when installing an expansion expander (optional).
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)
DE_No. label
Indicates the drive enclosure No.

Figure 2.22 Rear view of 3.5" type drive enclosure (single expander model)

Dual expander model

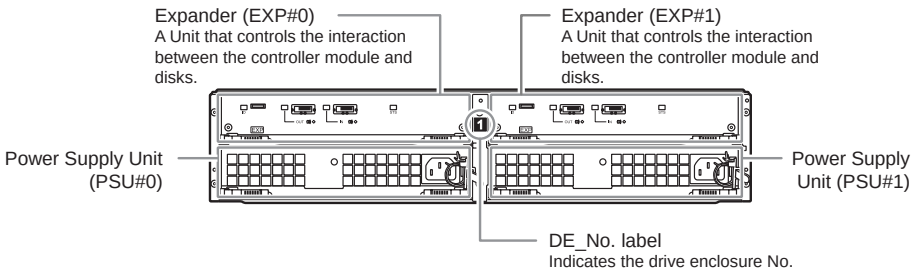

Expander (EXP#0)
A Unit that controls the interaction between the controller module and disks.
Expander (EXP#1)
A Unit that controls the interaction between the controller module and disks.
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)
DE_No. label
Indicates the drive enclosure No.

Figure 2.23 Rear view of 3.5" type drive enclosure (dual expander model)

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Expander

Figure 2.24 shows the expander.

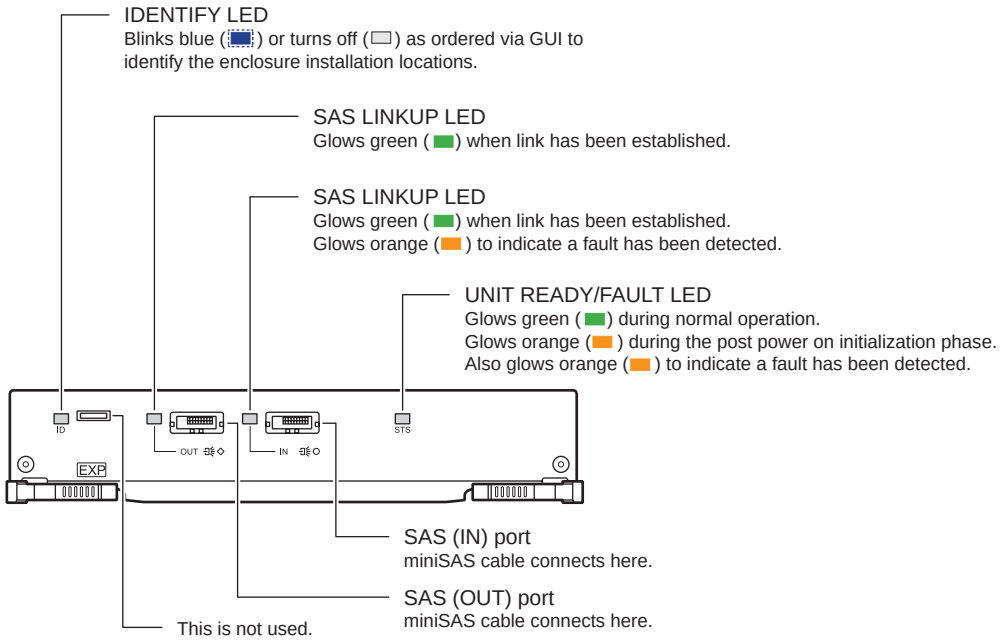
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
SAS LINKUP LED
Glows green ( ) when link has been established.
SAS LINKUP LED
Glows green ( ) when link has been established.
Glows orange ( ) to indicate a fault has been detected.
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on initialization phase.
Also glows orange ( ) to indicate a fault has been detected.
ID
OUT
IN
STS
EXP
SAS (IN) port
miniSAS cable connects here.
SAS (OUT) port
miniSAS cable connects here.
This is not used.

Figure 2.24 Expander (3.5" type drive enclosure)

Power supply unit

Figure 2.25 shows the power supply unit.

Note

The power supply unit has two internal cooling fans.

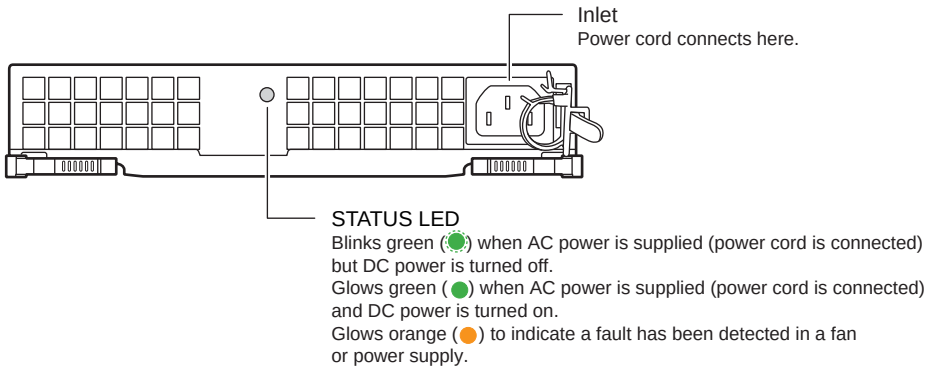
Inlet
Power cord connects here.
STATUS LED
Blinks green ( ) when AC power is supplied (power cord is connected) but DC power is turned off.
Glows green ( ) when AC power is supplied (power cord is connected) and DC power is turned on.
Glows orange ( ) to indicate a fault has been detected in a fan or power supply.

Figure 2.25 Power supply unit (3.5" type drive enclosure)

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IMPORTANT

- Each enclosure has two power supply units (PSU#0 and PSU#1). The power cords must be connected to the inlets of both power supply units.
- When connecting the power cord right after it is disconnected, wait for the STATUS LED of the power supply unit is turned off completely (about 10 seconds) before connecting it again.

2.4 2.5" Type Drive Enclosure

2.5" type drive enclosures contain 2.5" disks installed in the front, and expanders and power supply units (with fans) in the rear.

2.4.1 Front View

■ With flange cover

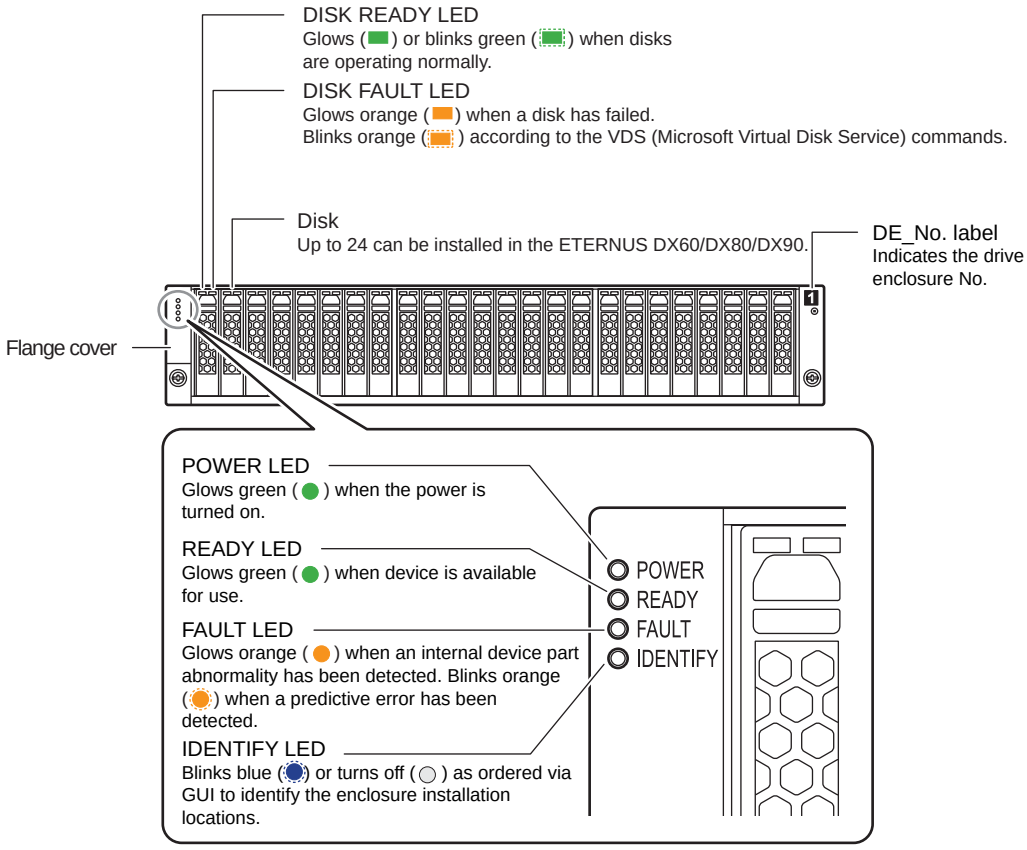
DISK READY LED
Glows ( ) or blinks green ( ) when disks are operating normally.
DISK FAULT LED
Glows orange ( ) when a disk has failed.
Blinks orange ( ) according to the VDS (Microsoft Virtual Disk Service) commands.
Disk
Up to 24 can be installed in the ETERNUS DX60/DX80/DX90.
DE_No. label
Indicates the drive enclosure No.
Flange cover
POWER LED
Glows green ( ) when the power is turned on.
READY LED
Glows green ( ) when device is available for use.
FAULT LED
Glows orange ( ) when an internal device part abnormality has been detected. Blinks orange ( ) when a predictive error has been detected.
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
POWER
READY
FAULT
IDENTIFY

Figure 2.26 Front view of 2.5" type drive enclosure (with flange cover)

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Without flange cover

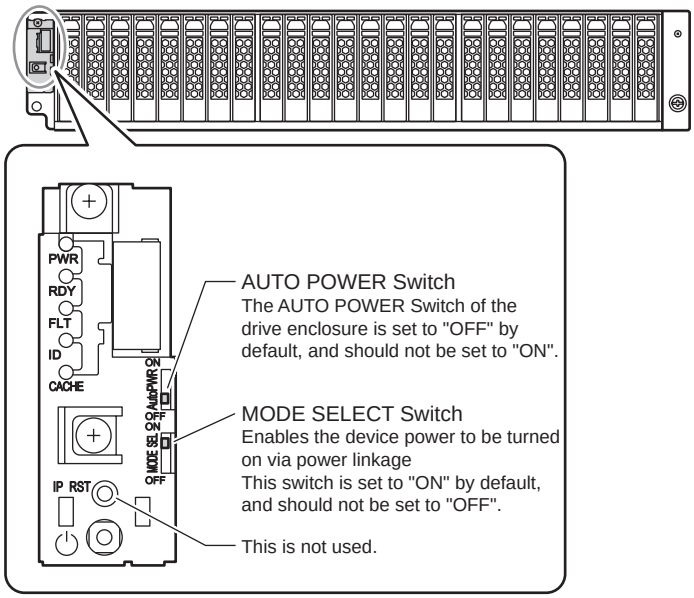


Figure 2.27 Front view of 2.5" type drive enclosure (without flange cover)

Disk slot numbers

Figure 2.28 shows the slot numbers of the disks in the drive enclosure.

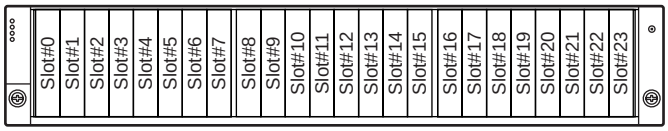
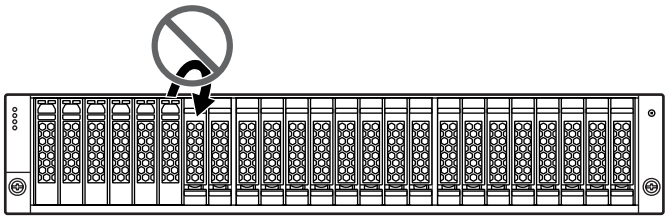


Figure 2.28 Disk slot numbers of 2.5" type drive enclosure

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



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2.4.2 Rear View

Single expander model

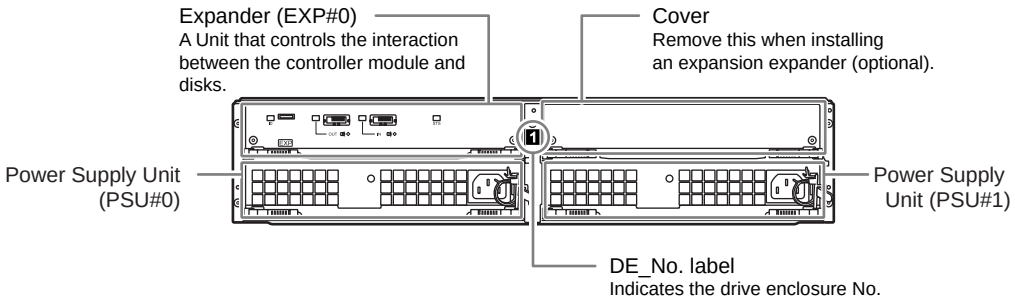
Expander (EXP#0)
A Unit that controls the interaction between the controller module and disks.
Cover
Remove this when installing an expansion expander (optional).
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)
DE_No. label
Indicates the drive enclosure No.

Figure 2.29 Rear view of 2.5" type drive enclosure (single expander model)

Dual expander model

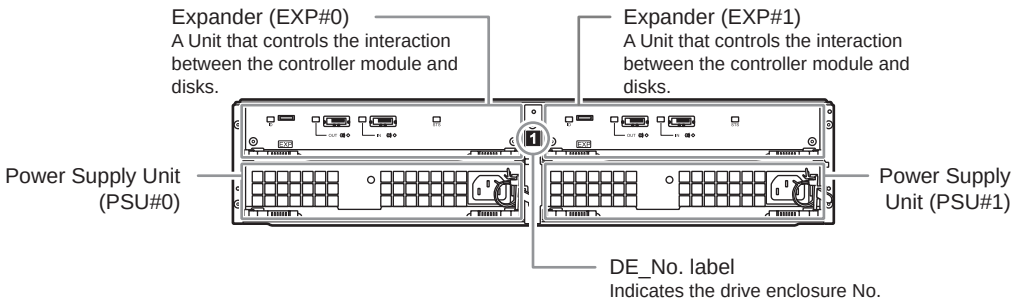
Expander (EXP#0)
A Unit that controls the interaction between the controller module and disks.
Expander (EXP#1)
A Unit that controls the interaction between the controller module and disks.
Power Supply Unit (PSU#0)
Power Supply Unit (PSU#1)
DE_No. label
Indicates the drive enclosure No.

Figure 2.30 Rear view of 2.5" type drive enclosure (dual expander model)

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Expander

Figure 2.31 shows the expander.

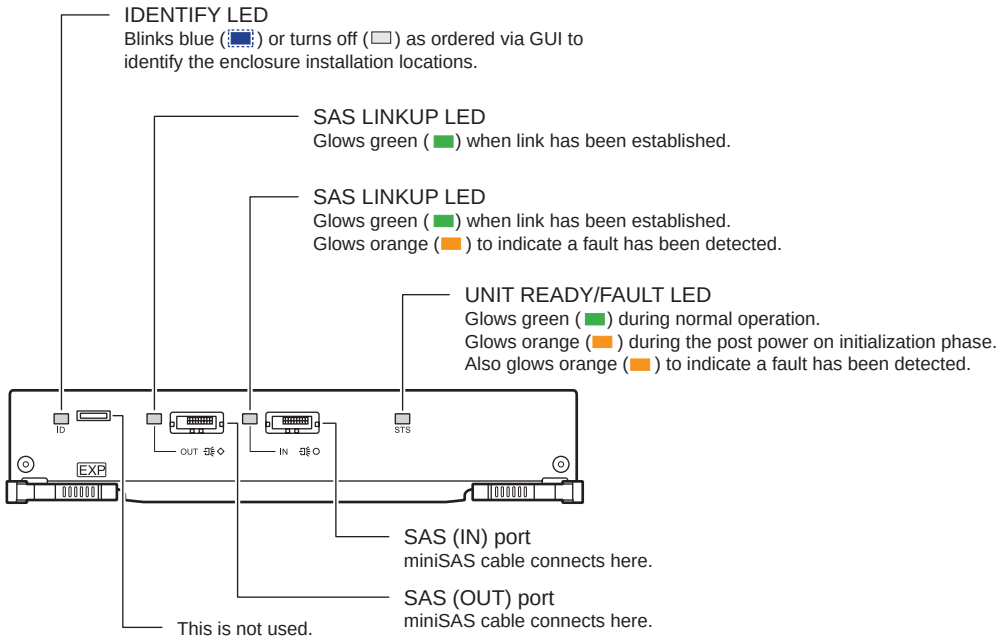
IDENTIFY LED
Blinks blue ( ) or turns off ( ) as ordered via GUI to identify the enclosure installation locations.
SAS LINKUP LED
Glows green ( ) when link has been established.
SAS LINKUP LED
Glows green ( ) when link has been established.
Glows orange ( ) to indicate a fault has been detected.
UNIT READY/FAULT LED
Glows green ( ) during normal operation.
Glows orange ( ) during the post power on initialization phase.
Also glows orange ( ) to indicate a fault has been detected.
ID
OUT
IN
STS
EXP
SAS (IN) port
miniSAS cable connects here.
SAS (OUT) port
miniSAS cable connects here.
This is not used.

Figure 2.31 Expander (2.5" type drive enclosure)

Power supply unit

Figure 2.32 shows the power supply unit.

Note

The power supply unit has two internal cooling fans.

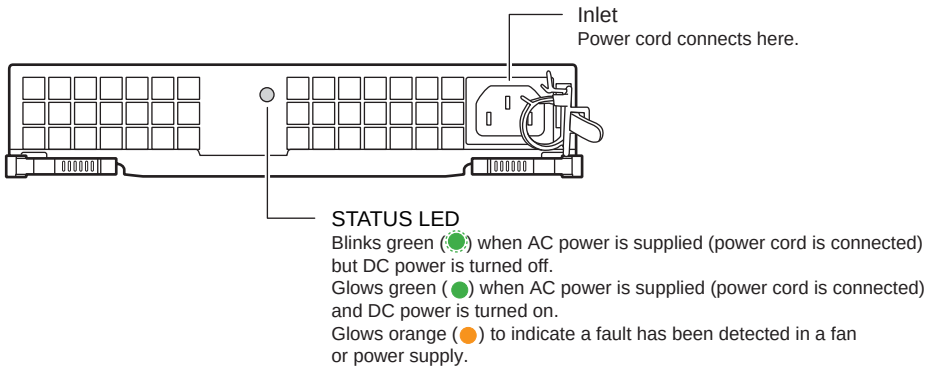
Inlet
Power cord connects here.
STATUS LED
Blinks green ( ) when AC power is supplied (power cord is connected) but DC power is turned off.
Glows green ( ) when AC power is supplied (power cord is connected) and DC power is turned on.
Glows orange ( ) to indicate a fault has been detected in a fan or power supply.

Figure 2.32 Power supply unit (2.5" type drive enclosure)

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IMPORTANT

- Each enclosure has two power supply units (PSU#0 and PSU#1). The power cords must be connected to the inlets of both power supply units.
- When connecting the power cord right after it is disconnected, wait for the STATUS LED of the power supply unit is turned off completely (about 10 seconds) before connecting it again.

2.5 AC Outlet Box

There are two sizes of AC outlet box: 1U and 2U.

2.5.1 AC Outlet Box (1U)

1U AC outlet box has four outlets and two inlets.

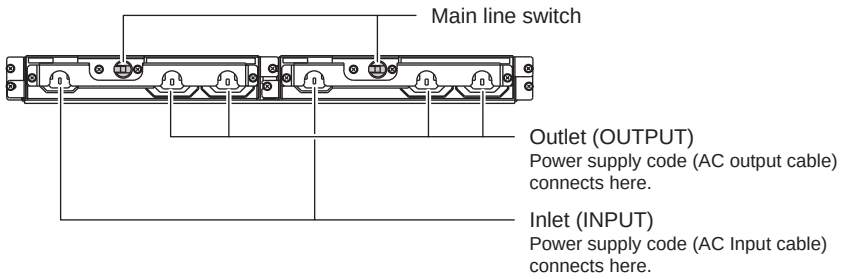

Figure 2.33 AC outlet box (1U)

2.5.2 AC Outlet Box (2U)

2U AC outlet box has twelve outlets and two inlets.

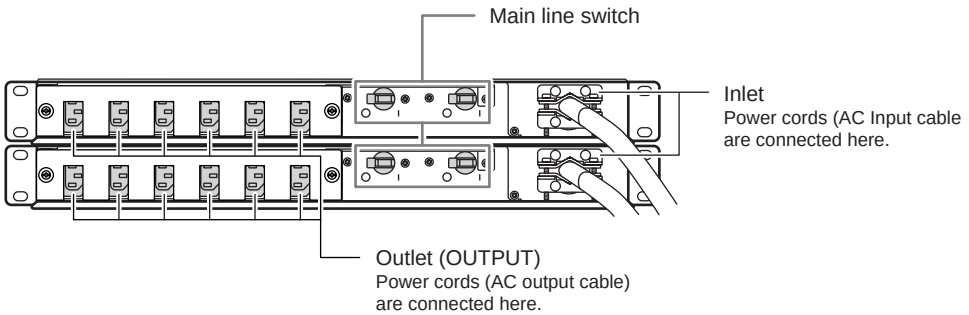

Figure 2.34 AC outlet box (2U)

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Chapter 3 Standard Operations

This chapter explains the procedures for turning the device on and off, attaching and removing the front or flange cover, turning on the AUTO POWER switch, and wearing a wrist strap.

3.1 Power ON Control

This section explains how to turn the power on.

IMPORTANT

- After turning the power on, it takes about 3 minutes for the device to become READY (i.e. the READY LED turns on). If an error is detected during the initial power-on diagnostic phase, a longer time (up to ten minutes) may be required before the READY LED turns on.
- Before turning the server on, check that the device, Fibre Channel switch, and Fibre Channel hub are all READY. If the server is turned on while any of these devices are not READY, the server may not be able to recognize the device.
- When the AUTO POWER switch of the controller enclosure is turned to "ON", supplying power to the ETERNUS DX60/DX80/DX90 will cause the ETERNUS DX60/DX80/DX90 to turn on automatically in cases such as when the power cord is connected or the power is recovered after power failure.
- When turning on the ETERNUS DX60/DX80/DX90 for the first time, volume formatting operation, which is set as factory default, may be performed. However, the ETERNUS DX60/DX80/DX90 setting operation can be continued.
  When canceling a volume format, delete the volume. For details on how to delete volume, refer to "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

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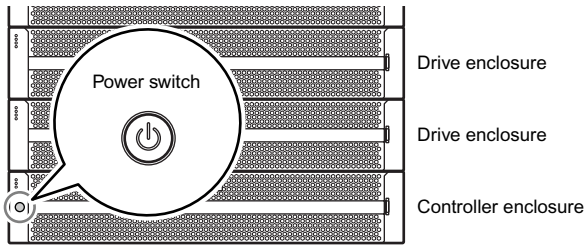
Procedure

1 Press the power switch (⏻) of the controller enclosure.

Controller enclosure POWER LED turns on.

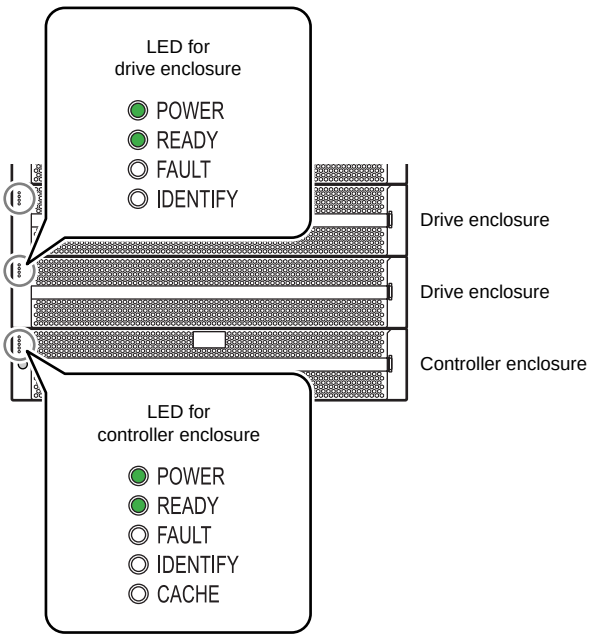
Note

When drive enclosures are installed, the power turns on automatically.



2 After a few minutes, check that controller enclosure's READY LED is lit up.

3 Check that all enclosure's POWER LED and READY LED are lit up.



End of procedure

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3.2 Power OFF Control

This section explains how to turn the power off.

IMPORTANT

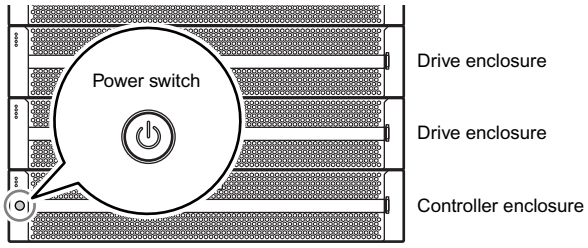
- When turning off the device, the power shuts off only after the data in the cache memory has been written to the hard disk. Therefore, it can take one minute (maximum six minutes) for the power supply to be completely turned off.
- Do not turn off the power of the device or network devices that connect the ETERNUS DX60/DX80/DX90 and server while the server is operating. Turning the power off may result in the loss of data or prevent data from being saved.

Procedure

1 Press and hold the console panel's power switch (⏻) for 4 seconds or longer.

The READY LED should turn off.

IMPORTANT Press the power switch only once. If the power switch is pressed again between the time of the READY LED turning off and the POWER LED turning off, the device power may turn on.



2 The device power is turned off.

When the power is turned off, the POWER LED will go out.

Note When drive enclosures are installed, the power turns off automatically.

End of procedure

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3.3 Attaching and Removing the Front Cover

This section explains how to attach and remove the front cover of the 3.5" type controller enclosure or 3.5" type drive enclosure.

CAUTION

Do

- After completing the operation, be sure to reattach the front cover.

Note

This section explains how to attach and remove the front cover of the 3.5" type controller enclosure, but the same procedure is used to attach and remove the front cover of the 3.5" type drive enclosure.

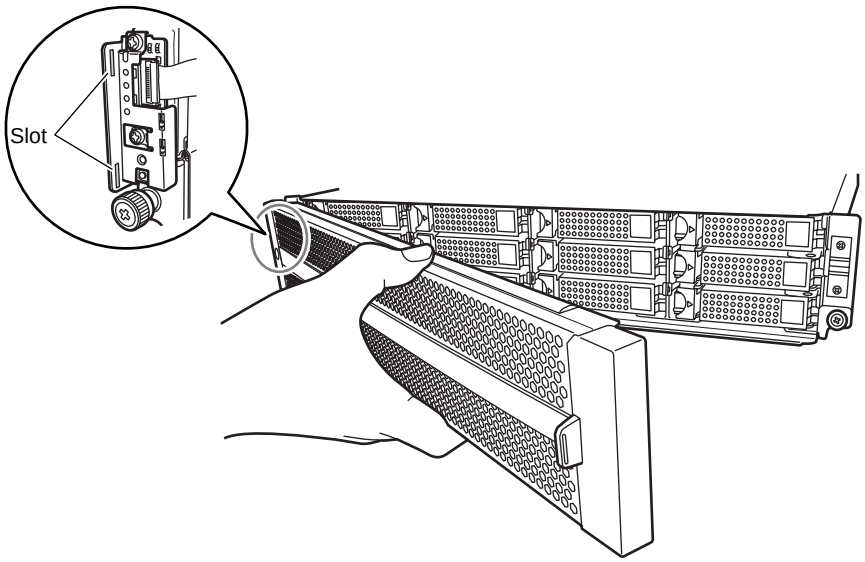
Procedure for attaching the front cover

Attach the front cover in the following order.

Procedure

1 Fit the front cover in the left end slot of the controller enclosure to attach.

IMPORTANT Be careful so that the part of the front cover to be fit in the slot does not touch the power switch (⏻).



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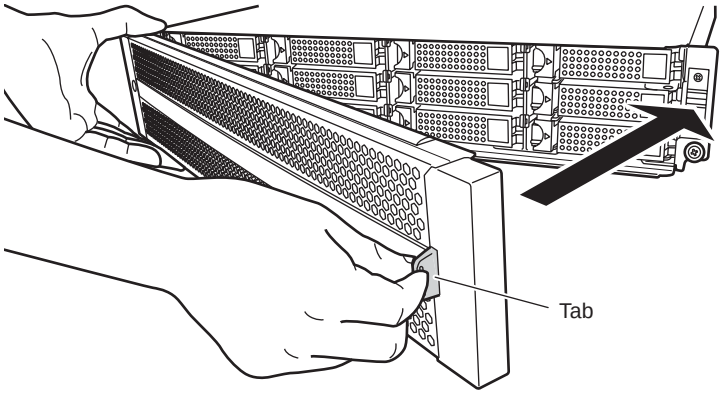
2 Holding the tab on the front cover, attach the right side of the cover to the enclosure.

CAUTION

Do

- When removing the front cover, support its left side with your left hand, to prevent it from coming loose and falling.



End of procedure

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Procedure for removing the front cover

Remove the front cover in the following order.

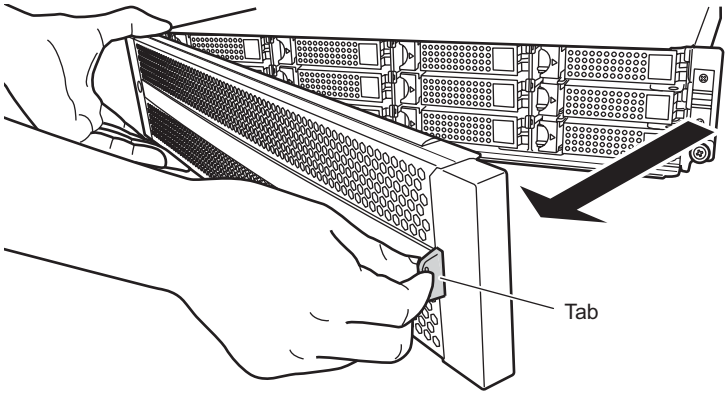
Procedure

1 By holding the tab of the front cover, pull the cover toward you to remove it.

CAUTION

Do

- When attaching the right side of the front cover, support its left side with your left hand, to prevent it from coming loose and falling.



End of procedure

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3.4 Attaching and Removing the Flange Cover

This section explains how to attach and remove the flange cover of the 2.5" type controller enclosure and the 2.5" type drive enclosure.

CAUTION

Do

- At the completion of this operation, check that the flange cover is attached.

Note

This section explains how to attach and remove the flange cover of the 2.5" type controller enclosure, but the same procedure is used to attach and remove the flange cover of the 2.5" type drive enclosure.

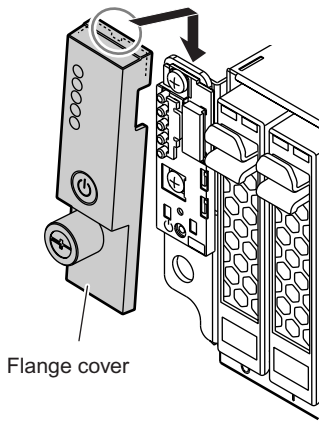
Procedure for attaching the flange cover

Attach the flange cover in the following order.

Procedure

1 Slide the tab inside the top of the flange cover over the top-left corner of the controller enclosure.

IMPORTANT When fitting the flange cover, be careful not to touch the power switch (⏻).



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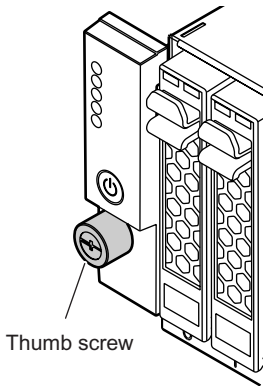
2 Tighten the thumb screw to fasten the flange cover.



End of procedure

- Procedure for removing the flange cover

  Loosen the thumb screw to remove the flange cover.

3.5 Turning the AUTO POWER Switch On/Off

This section explains how to enable the AC automatic linkage mode by turning the AUTO POWER switch of the controller enclosure to "ON".
When AC automatic linkage mode is enabled, the ETERNUS DX60/DX80/DX90 is automatically turned on when the power supply recovers after a power failure.
When the AUTO POWER switch of the controller enclosure is set to "OFF", the AC automatic linkage mode is disabled.

Procedure

1 Remove the front cover from the 3.5" type controller enclosure.
Remove the flange cover from the 2.5" type controller enclosure.
For details on how to remove the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).
For details on how to remove the flange cover, refer to "3.4 Attaching and Removing the Flange Cover" (page 78).

2 Turn the AUTO POWER switch of the controller enclosure to "ON".
Push up the AUTO POWER switch to the "ON" side using the pin that is provided with the ETERNUS DX60/DX80/DX90.

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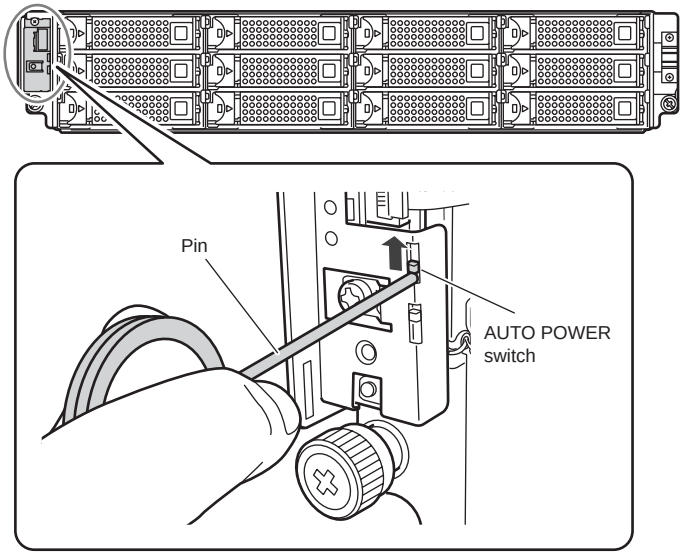

IMPORTANT

- The AUTO POWER switch of the drive enclosure is turned to "OFF" as the factory setting, and should not be turned to "ON".
- If AC power is being supplied, turning the AUTO POWER switch of the controller enclosure to "ON" will cause the ETERNUS DX60/DX80/DX90 to turn on.
- If the AUTO POWER switch of the controller enclosure is turned to "ON", connecting the power cord to the outlet will cause the ETERNUS DX60/DX80/DX90 to turn on.

3 Re-attach the front cover to the 3.5" type controller enclosure.
Re-attach the flange cover to the 2.5" type controller enclosure.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).
For details on how to attach the flange cover, refer to "3.4 Attaching and Removing the Flange Cover" (page 78).

End of procedure

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3.6 Wearing the Wrist Strap

The wrist strap must be worn to discharge the human body's natural static electricity.
This section explains how to wear the wrist strap.

CAUTION

Do

When performing the following operations, make sure to wear the supplied wrist strap, and do not remove it until the operation is complete.

- Installing a controller enclosure, drive enclosures, and AC outlet boxes
- Connecting cables
- Installing disks

One end of the wrist strap (part A in the figures) connects to the metal frame of the ETERNUS DX60/DX80/DX90, while the other end (part B in the figures) should be wrapped around your wrist. Remove the protective film from part A, and attach it to the metal frame of the rack.

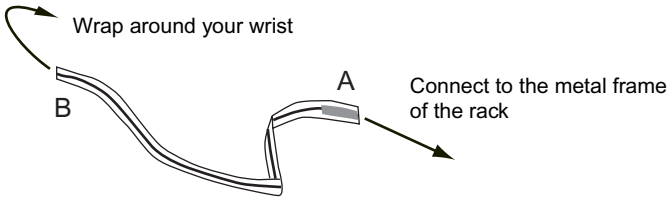

Figure 3.1 Wrist strap

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Chapter 4 Flow from Installation to Operation

This chapter explains the flow of work from installation to the start of ETERNUS DX60/DX80/DX90 operation.

1

Preparation

(1) Package Contents Check

Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" and check that there are no missing parts.
Prepare the following manuals:

- "ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions"
- "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"
- "ETERNUS DX60/DX80/DX90 Web GUI User Guide"
- "ETERNUS DX Disk storage systems Server Connection Guide"
- Other related manuals, for example, for a server or networking equipment.

(2) Installation and Connection Check

Check the required space for the ETERNUS DX60/DX80/DX90, conditions and environment for the location, and the type and number of the wall outlets.

- "5.1 Installation Preparation" (page 86)
- "6.1 Connection Preparation" (page 106)

(3) Setup Preparation

- Complete the following information in the Network Settings label and attach it on the ETERNUS DX60/DX80/DX90.
  - IP address and subnet mask for the ETERNUS DX60/DX80/DX90
  - IP address for maintenance work
- Perform the following settings for the PC.
  - Set Network Environment
    IP address: 192.168.1.2
    Subnet mask: 255.255.255.0
  - Set the Web browser
    Proxy server and Cache : Disable
    Java Script, style sheets, and cookies : Enable

"7.1 Setup Preparation" (page 136)

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2

Installation

Attach the rack mount kit to the rack and install the ETERNUS DX60/DX80/DX90.

Refer

"5.2 Rack Installation" (page 88)

3

Cable Connection

Connect the following cables.

- LAN cable (For operation management)
- Fibre Channel cable (Fibre Channel model only)
- LAN cable (iSCSI model only)
- miniSAS cable (SAS model only)
- miniSAS cable (For connecting drive enclosures)
- Power cords

Refer

"Chapter 6 Cable Connection" (page 106)

4

Startup

Connect the PC to the ETERNUS DX60/DX80/DX90 with a LAN cable (for operation management), and turn on the ETERNUS DX60/DX80/DX90.

Refer

- "7.1 Setup Preparation" (page 136)
- "7.2 Basic Setup" (page 139)

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5

Basic Setup

Start GUI from the Web browser of the connected PC, and perform the basic setup of the ETERNUS DX60/DX80/DX90.

(1) Initial Setup

Perform device initial setup.

- Set Date and Time
- Set Storage System Name
- Change Password
- Modify the FC Port Mode (only for ETERNUS DX90)
- Port Parameter Settings
- Setup Network Environment

"7.2.1 Initial Setup" (page 140)

(2) Configuration Wizard

Perform the settings necessary for device operation.

- Create RAID Group
- Create Volume
- Define Host
- Configure Affinity Group
- Define LUN Mapping

"7.2.2 Configuration Wizard" (page 149)

(3) Assigning Hot Spares

To add hot spares, register them.

"7.2.3 Hot Spare Registration" (page 160)

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6

Other Settings

Perform the following settings (as required).

(1) Advanced Copy Setup

If the Advanced Copy functions are to be used, set them up.

Refer
"7.3 Advanced Copy Setup" (page 163)

(2) Monitoring Setup

Perform the ETERNUS DX60/DX80/DX90 monitoring setup if required.

- Notification of ETERNUS DX60/DX80/DX90 problems as they occur is possible if the event notification method and level have been set.
- If e-mail notification of ETERNUS DX60/DX80/DX90 errors is to be used, set a recipient e-mail address.
- If the ETERNUS DX60/DX80/DX90 is connected to a PRIMERGY server and the "ServerView" server monitoring tool is to be used, perform the settings required for SNMP Trap Transfers.
- If the Remote Notice function is to be used, perform the settings required to allow the ETERNUS DX60/DX80/DX90 to connect to a Fujitsu remote server.

Refer
"7.4 Monitoring Setup" (page 169)

(3) Server Connection Setup

Perform the settings required to connect to the server. Install the drivers and perform the network settings.

Refer
"7.5 Server Connection Setup" (page 179)

7

Operation and Maintenance

Refer
"Chapter 9 Operation and Maintenance" (page 201)

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Chapter 5 Installation

This chapter describes the ETERNUS DX60/DX80/DX90 installation procedure.
Before installing the device, make sure to check the "ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions".

"ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions"

5.1 Installation Preparation

5.1.1 Placement Area

- Installation area

Refer to the placement area of the rack to install the device.

- Installation condition

Refer to "Instructions for installation" in "ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions" and set the device in a location where all the requirements are satisfied.

IMPORTANT	The speed of the ETERNUS DX60/DX80/DX90 fans is stepped up and down in response to the ambient temperature. When the ambient temperature reaches a high level, the fan will rotate at a higher speed, which will increase the noise level. Up to 25°C the noise level should not exceed about 43.5dB, but higher temperatures or abnormal fan situations can result in noise levels over 43.5dB, and seclusion in a dedicated server room is generally recommended.

- Air conditioning

The inside of the ETERNUS DX60/DX80/DX90 is cooled down by taking air through the front side and blowing it out the back. Place other devices so that the front of the ETERNUS DX60/DX80/DX90 is not exposed to their exhaust air.

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5.1.2 Check the Number of Wall Outlets

Check the required type and number of the wall outlets.

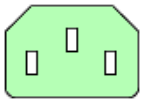
Type of wall outlet connectors

All ETERNUS DX60/DX80/DX90 device models include US spec. AC200-240V cables (with plug) as standard.
In addition, power cords must comply with the particular safety standards of the country of use. In some cases, a power cord will need to be purchased locally to satisfy the relevant power safety requirements.

IMPORTANT

When determining the rack-mounting layout, consider the interaction between the position of each drive enclosure and AC outlet box in the rack and the length of each cable.
For example, for something installed at the top of a 1,800mm rack, about 2m of cable will be required to reach the bottom of the rack.

Table 5.1 Wall outlets and cable lengths

Cable type	ETERNUS DX60/DX80/ DX90 connector	Power outlet connector	Cable length	Note
Controller Enclosure Drive Enclosure AC200V outlet box (1U)	IEC320 C13 	NEMA L6-15P	4m	Max. rating: 250V 15A (Normal usage <12A)
AC200V outlet box (2U)	Direct connection	NEMA L6-20P	4m	Max. rating: 250V 20A (Normal usage <16A)

Required Number of Power Outlets

The number of power outlets required will depend on the number of drive enclosures and AC outlet boxes.

- AC Outlet Boxes Not Connected

Table 5.2 Required number of power outlets (when AC outlet boxes are not connected)

Component	Combination pattern									
Controller Enclosure	1	1	1	1	1	1	1	1	1	1
Drive Enclosure	0	1	2	3	4	5	6	7	8	9
No. of power outlets	2	4	6	8	10	12	14	16	18	20

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- AC Outlet Boxes Connected

Table 5.3 Required number of power outlets (when AC outlet boxes are connected)

Component	Combination pattern						
Controller Enclosure	1	1	1	1	1	1	1
Drive Enclosure	0 – 1	2 – 3	4 – 5	6 – 7	8 – 9	0 – 5	6 – 9
AC Outlet Box (1U)	1	2	3	4	5	–	–
AC Outlet Box (2U)	–	–	–	–	–	1	2
No. of power outlets	2	4	6	8	10	2	4

5.2 Rack Installation

This section describes the procedure for installing the ETERNUS DX60/DX80/DX90 in a rack.

Make sure to check "ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions" before installation. Also refer to the manual provided with racks.

"ETERNUS DX60/DX80/DX90 Disk storage system Safety Precautions"
Manual provided with racks

CAUTION

Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.
- If components are installed in a way other as described herein, damage and/or device failure or electrical shock may occur.
- Do not install the ETERNUS DX60/DX80/DX90 with cables, such as power cords, connected.
- This device contains delicate components, and should be handled gently. Do not drop or knock the device against the rack when installing it. Also, do not knock the other devices installed in the rack.
- If no other components are installed, attach the blind panels provided with the rack.

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Installation conditions for other rack brands

When installing the ETERNUS DX60/DX80/DX90 in other 19-inch rack brands, make sure that the following conditions are met.
Note that there is no guarantee that operations will perform properly when other rack brands are used to install the ETERNUS DX60/DX80/DX90.

- Pitch for mounting holes
  EIA standard universal pitch
- Size for mounting holes
  The correct hole size for M6 screws
- Load capacity
  The maximum load capacity of the rack must be more than the weight of the ETERNUS DX60/DX80/DX90.
- Unit installation area
  The dimensions of the area shown in Figure 5.1 must match the conditions described in Table 5.4.

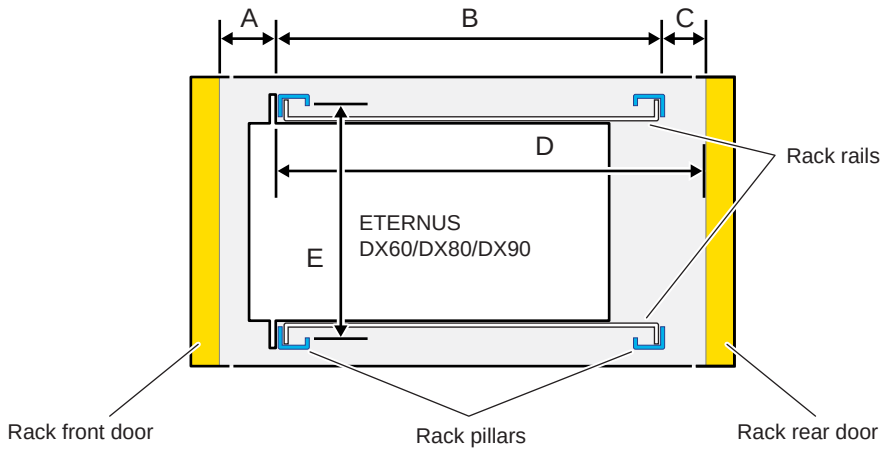

Figure 5.1 Unit installation area (when installing other rack brands)

Table 5.4 Conditions of the unit installation area (when installing other rack brands)

Area	Description	Conditions
A	From the fixed part of the ETERNUS DX60/DX80/DX90 on the front side to the inner side of the front door	40mm or more
B	Space between the rack pillars on the front and back sides (inside dimensions)	630mm to 800mm
C	From the fixed part of the ETERNUS DX60/DX80/DX90 on the back side to the inner side of the rear door	60mm or more (recommended)
D	From the fixed part of the ETERNUS DX60/DX80/DX90 on the front side to the inner side of the rear door	830mm or more
E	Rack mount kit installation area	482mm or more (recommended)

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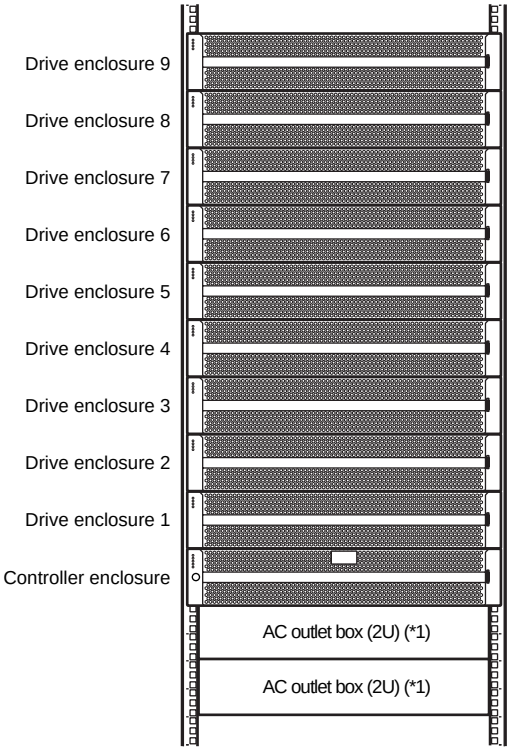
Rack installation example

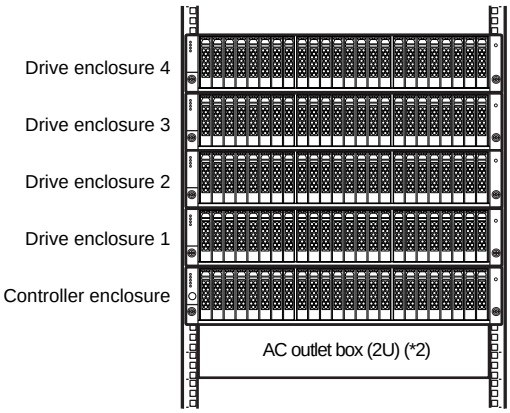
Install the controller enclosure, drive enclosures and the AC outlet box in the following layout.

- When installing all 3.5" type enclosures



*1: Two 2U size AC outlet boxes are installed in this example. Alternatively, five 1U size AC outlet boxes need to be installed instead.

- When installing all 2.5" type enclosures



*2: One 2U size AC outlet box is installed in this example. Alternatively, three 1U size AC outlet boxes need to be installed instead.

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IMPORTANT

- For the ETERNUS DX80/DX90 (2.5" disk model), 3.5" type and 2.5" type enclosures can be installed together.
- ETERNUS DX60/DX80/DX90 components should be installed in a rack in the following order (from the bottom upwards):
  (1) AC outlet box(es)
  (2) Controller enclosure
  (3) Drive enclosure(s)

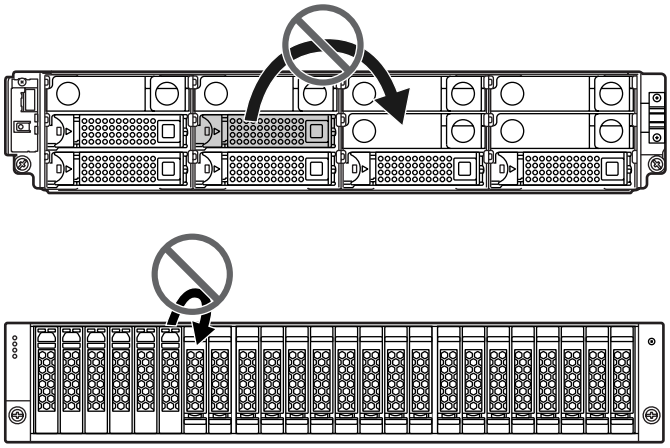
5.2.1 Installing Controller Enclosure

This section describes how to install the controller enclosure in a rack.

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



Procedure

1 Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

Refer "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"

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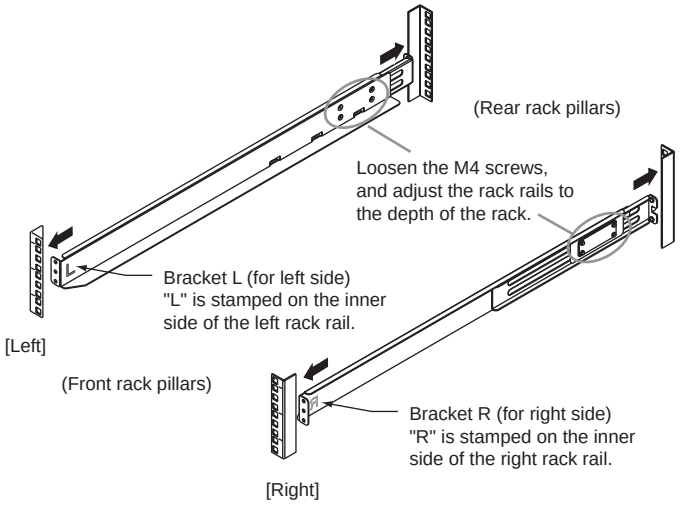
2 Adjust the rack rails (bracket L (for left side) and bracket R (for right side)) sizes to fit the rack.

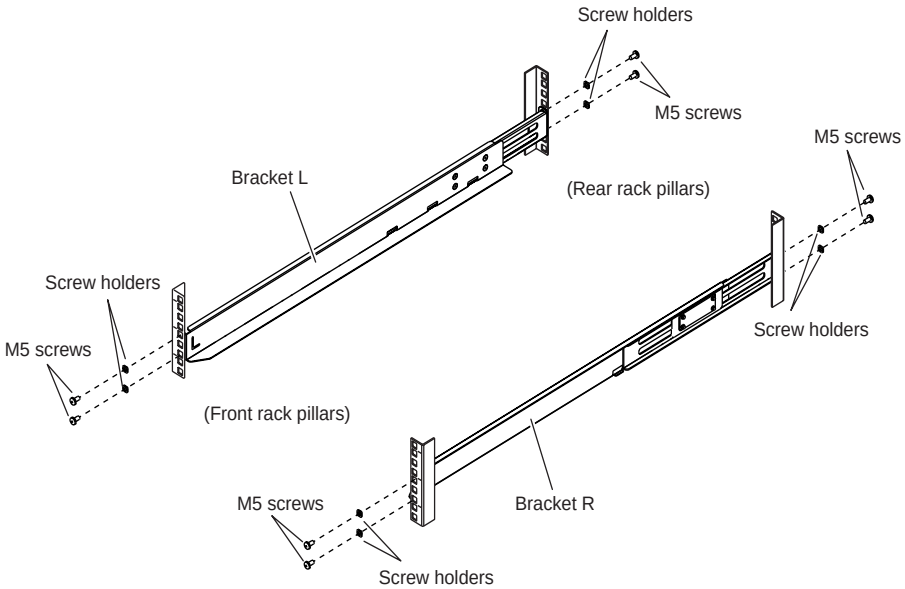
Reposition the M4 screws to adjust the length of the rack rails (brackets) to match the distance between the front and rear rack pillars. Leave the M4 screws slightly unscrewed, as the bracket must be attached to the rack before they can be completely tightened.


(Rear rack pillars)
Loosen the M4 screws,
and adjust the rack rails to
the depth of the rack.
Bracket L (for left side)
"L" is stamped on the inner
side of the left rack rail.
[Left]
(Front rack pillars)
Bracket R (for right side)
"R" is stamped on the inner
side of the right rack rail.
[Right]

3 Attach the rack rails (brackets) to the rack.

Note

- When the holes in the rack pillars are square, use the screw holders to attach.
- Make sure to attach the rack rails (brackets) and rack pillars so that they fit exactly together without any space between them.



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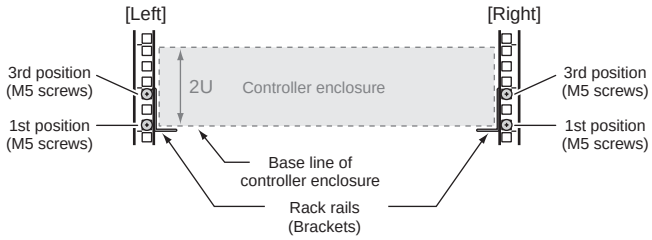
The four M5 screw positions for the rack rails (brackets) are determined relatively to the base line of controller enclosure.
The M5 screws should be inserted in the 1st and 3rd holes above the base line.



4 Tighten the M4 screws of the rack rails (brackets) that were slightly unscrewed in Step 2.

5 For a 3.5" type controller enclosure, remove the front cover of the controller enclosure.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

6 Install the controller enclosure in the rack.

CAUTION

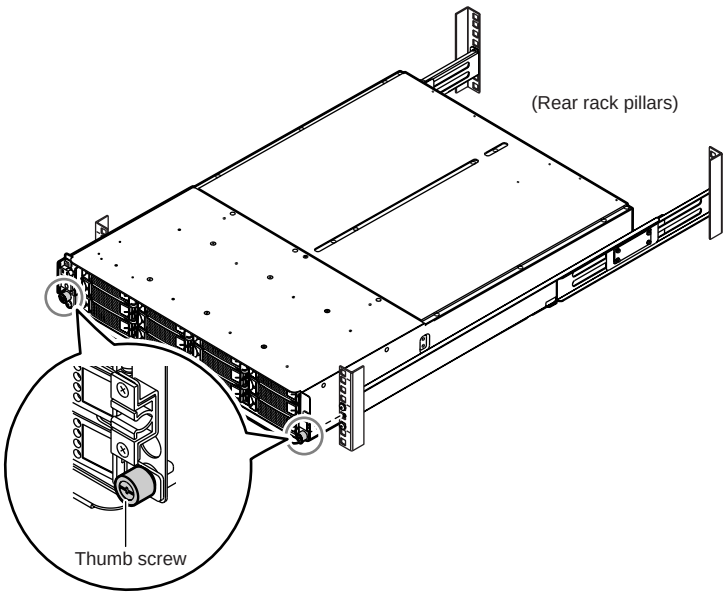
Do

- When installing or removing the controller enclosure to or from the rack, make sure to have the right and left sides and the bottom of the controller enclosure by two or more people. Failure to do so may cause injury.

7 Fix the controller enclosure in the rack.

■ 3.5" type controller enclosure

Use the two thumb screws at the front of the controller enclosure to fasten it in the rack.



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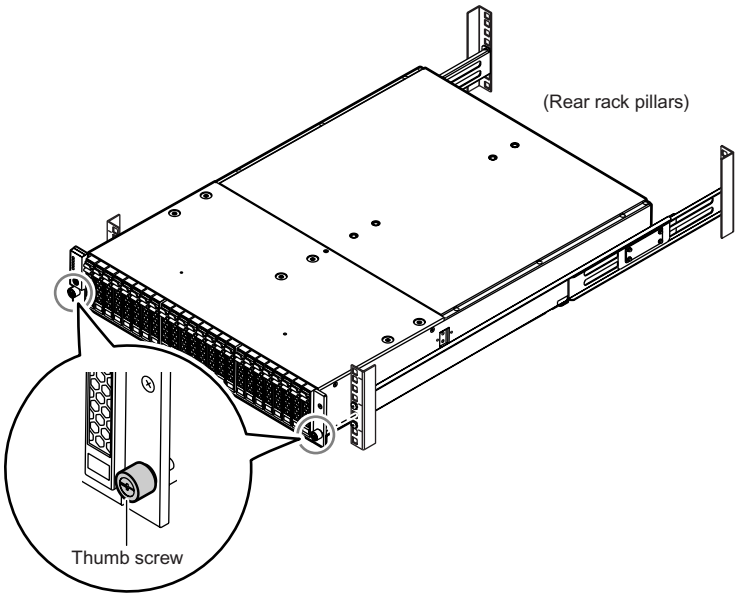
■ 2.5" type controller enclosure

- Use the thumb screw to fasten the front right of the controller enclosure to the rack.
- After attaching the supplied flange cover, use the thumb screw to fasten the front left of the controller enclosure to the rack.
  For details on how to attach the flange cover, refer to "3.4 Attaching and Removing the Flange Cover" (page 78).



8 For a 3.5" type controller enclosure, replace the front cover.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

End of procedure

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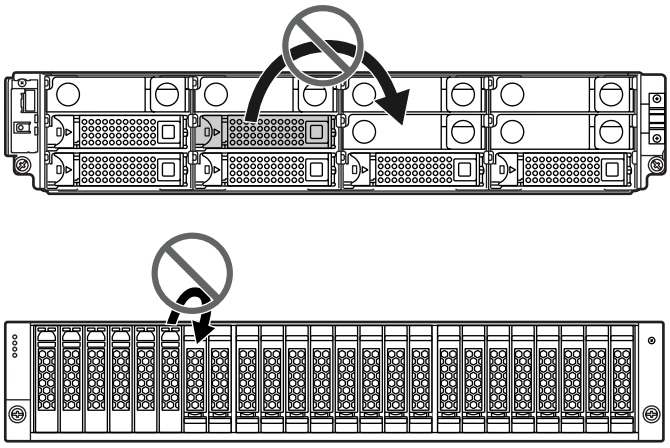
5.2.2 Installing Drive Enclosure

This section describes how to install the drive enclosure in a rack.

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



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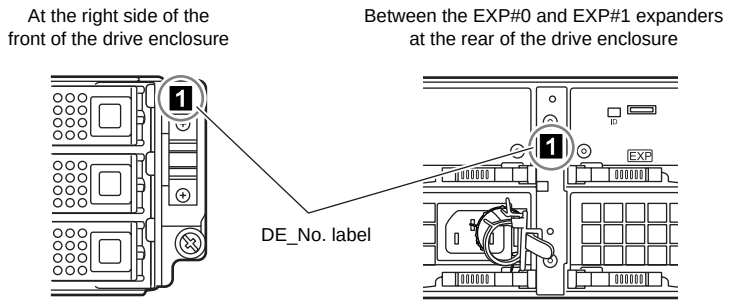
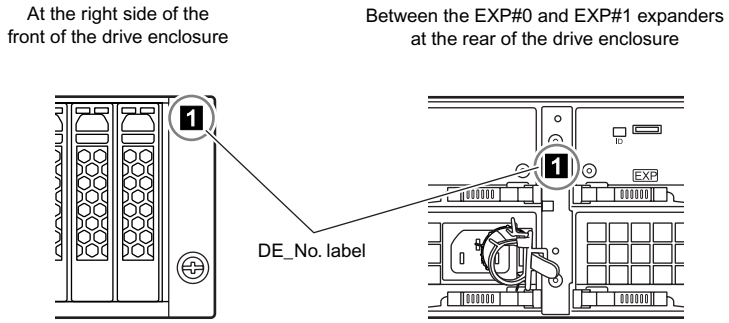
IMPORTANT

When installing multiple drive enclosures, install them on the controller enclosure in order of the "DE_No. label" attached on the drive enclosure. The "DE_No. label" is attached in the following location.

- 3.5" type drive enclosure


At the right side of the front of the drive enclosure
Between the EXP#0 and EXP#1 expanders at the rear of the drive enclosure
1
1
EXP
DE_No. label

- 2.5" type drive enclosure


At the right side of the front of the drive enclosure
Between the EXP#0 and EXP#1 expanders at the rear of the drive enclosure
1
1
EXP
DE_No. label

Procedure

1 Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

Refer "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"

2 Adjust the rack rail (bracket L (for left side) and bracket R (for right side)) sizes to fit the rack.

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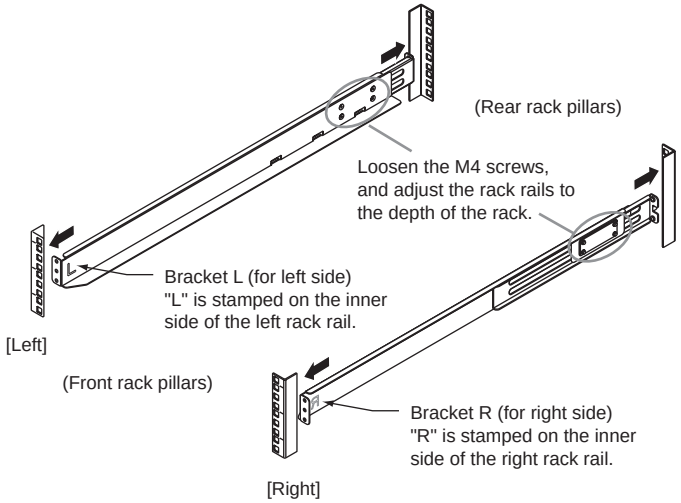
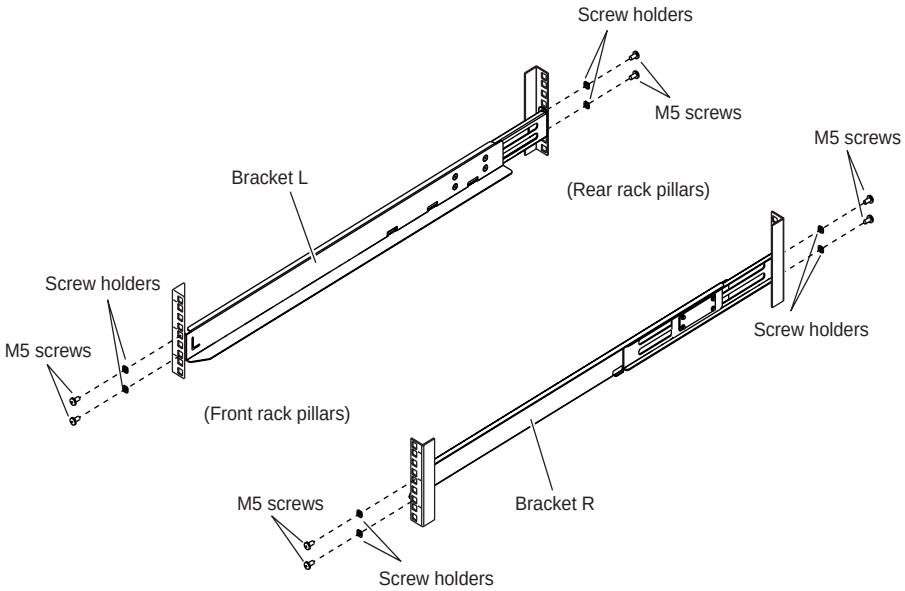
Reposition the M4 screws to adjust the length of the rack rails (brackets) to match the distance between the front and rear rack pillars. Leave the M4 screws slightly unscrewed, as the bracket must be attached to the rack before they can be completely tightened.


(Rear rack pillars)
Loosen the M4 screws,
and adjust the rack rails to
the depth of the rack.
Bracket L (for left side)
"L" is stamped on the inner
side of the left rack rail.
[Left]
(Front rack pillars)
Bracket R (for right side)
"R" is stamped on the inner
side of the right rack rail.
[Right]

3 Attach the rack rails (brackets) to the rack.

Note

- If the rack pillars have square (approx. 9mm) holes, screw holders will need to be used when attaching the rack rails (brackets).
- Make sure to attach the rack rails (brackets) and rack pillars so that they fit exactly together without any space between them.



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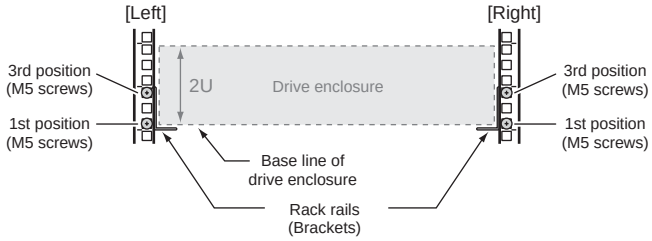
The four M5 screw positions for the rack rails (brackets) are determined relative to the drive enclosure base line.
The M5 screws should be inserted in the 1st and 3rd holes above the base line.



4 Tighten the M4 screws of the rack rails (brackets) that were slightly unscrewed in Step 2.

5 For 3.5" type drive enclosures, first remove the front cover.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

6 Install the drive enclosure in the rack.

CAUTION

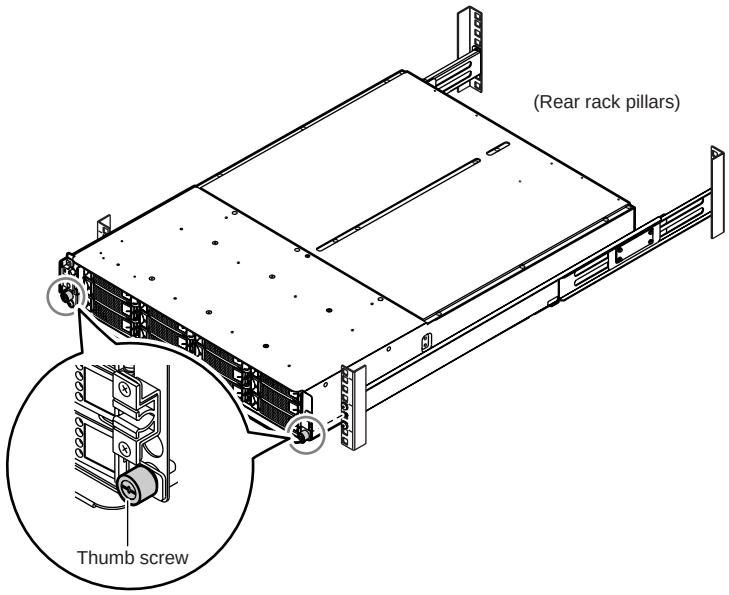
Do

- When installing or removing the drive enclosure to or from the rack, make sure to have the right and left sides and the bottom of the drive enclosure by two or more people. Failure to do so may cause injury.

7 Fasten the drive enclosure in the rack.

■ 3.5" type drive enclosure

Use the two thumb screws at the front of the drive enclosure to fasten it in the rack.



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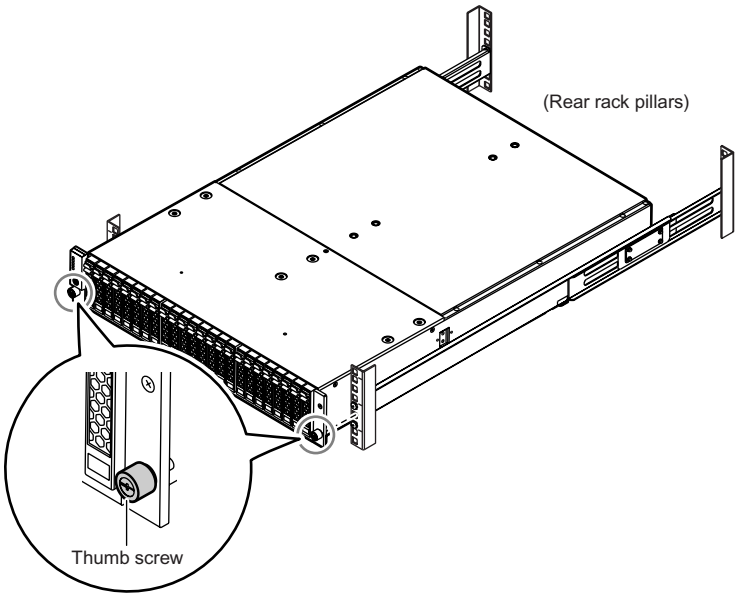
■ 2.5" type drive enclosure

- Use the thumb screw to fasten the front right of the drive enclosure to the rack.
- After attaching the supplied flange cover, use the thumb screw to fasten the front left of the drive enclosure to the rack.
  For details on how to attach the flange cover, refer to "3.4 Attaching and Removing the Flange Cover" (page 78).



8 For 3.5" type drive enclosures, finish by replacing the front cover.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

End of procedure

5.2.3 Installing AC Outlet Box (1U)

This section describes how to install the 1U AC outlet box in a rack.

CAUTION

Do Not

- AC outlet box cannot be connected to the device other than ETERNUS DX60/DX80/DX90.

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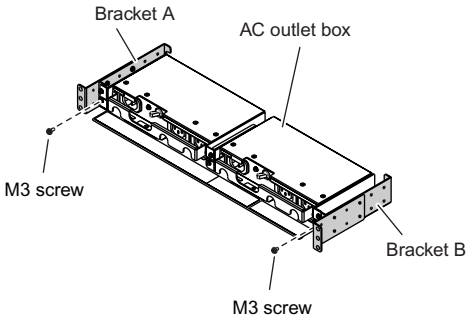
Procedure

1 Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

Refer "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"

2 Remove the two brackets temporarily attached to the AC outlet box.

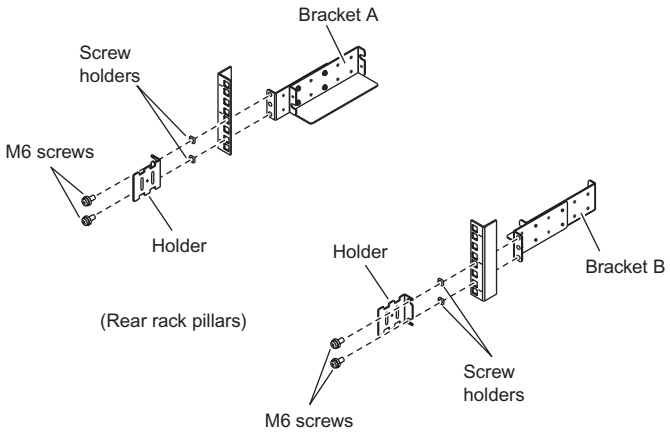
Remove the two M3 screws from the front of the AC outlet box to free the brackets.



3 Attach the brackets and holders to the rack.

Note

When the holes in the rack pillars are square, use the screw holders to attach.



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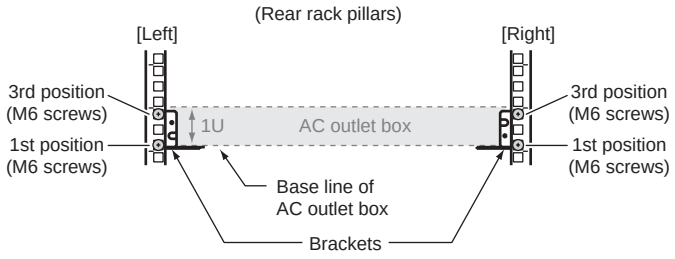
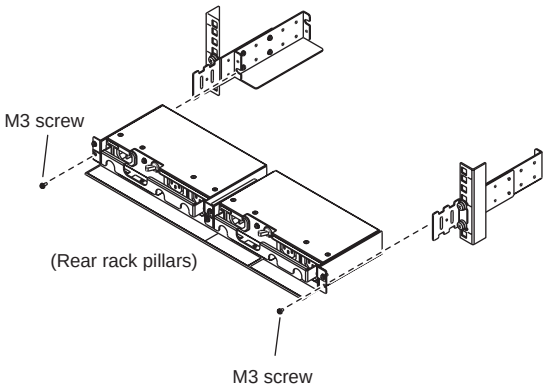
The four M6 screw positions for the brackets are determined relative to the AC outlet box base line.
The M6 screws should be inserted in the 1st and 3rd holes above the base line.



4 Install the AC outlet box in the rack.

Fasten the AC outlet box to the bracket with the two M3 screws removed in Step 2.



5 Attach the blank panel to the front side of the rack.

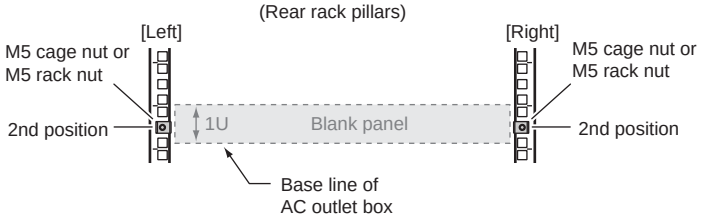
The blank panel should be attached at the same height as the AC outlet box.

5-1 Attach the M5 cage nuts or M5 rack nuts to the front rack pillar.

Note

- Use the M5 cage nuts if the rack pillar holes are square.
- Use the M5 rack nuts if the rack pillar holes are round.

- Attachment positions
  On either side, insert two M5 cage nuts or M5 rack nuts in the 2nd holes above the blank panel base line.



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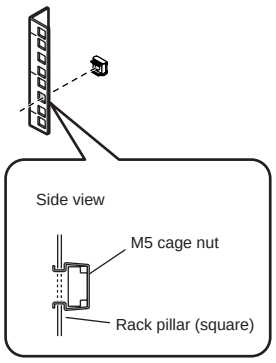
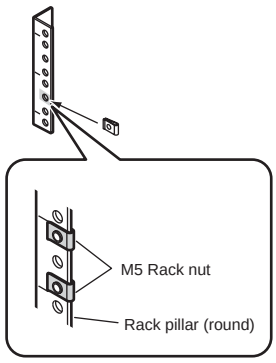
- Attachment procedure

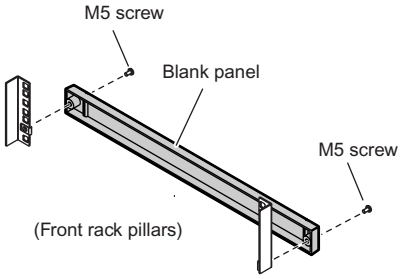
M5 cage nut
Clip the cage nut tabs into the desired hole from the inside.

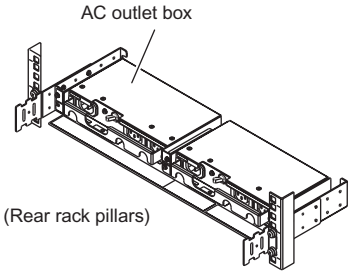


M5 rack nut
Clip the rack nut over the desired hole from the side.



5-2 Attach the blank panel to the rack pillars using two black M5 screws.





End of procedure

5.2.4 Installing AC Outlet Box (2U)

This section describes how to install the 2U AC outlet box in a rack.

CAUTION

Do Not

- AC outlet box cannot be connected to the device other than ETERNUS DX60/DX80/DX90.

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Procedure

1 Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

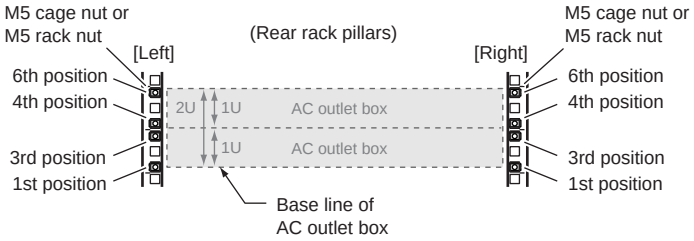
Refer "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"

2 Attach the M5 cage nuts or M5 rack nuts to the rear rack pillar.

Note

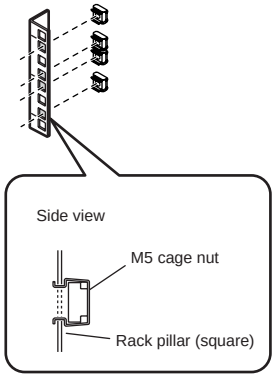
- Use the M5 cage nuts if the rack pillar holes are square.
- Use the M5 rack nuts if the rack pillar holes are round.

- Attachment positions
  On either side, insert eight M5 cage nuts or M5 rack nuts in the 1st, 3rd, 4th, and 6th holes above the AC outlet box base line.

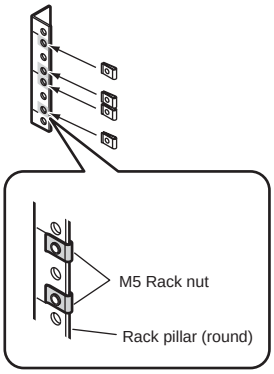


- Attachment procedure

M5 cage nut
Clip the cage nut tabs into the desired hole from the inside.



M5 rack nut
Clip the rack nut over the desired hole from the side.



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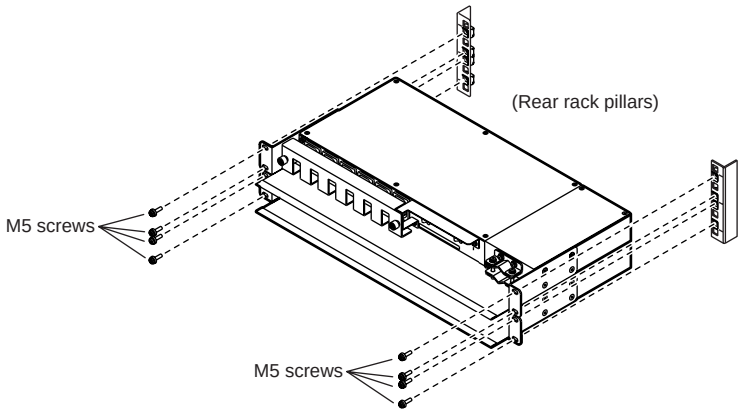
3 Install the AC outlet box in the rack.

Fasten it to the prepared holes in the pillars with eight M5 screws.



4 Attach the blank panel to the rack front.

Install it in the same position as the AC outlet box.

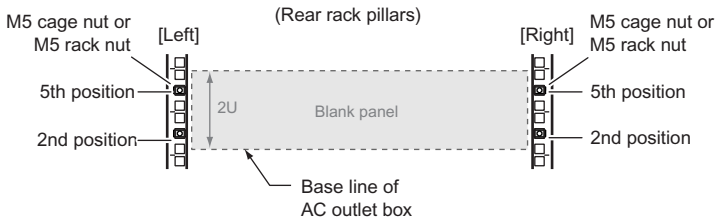
4-1 Attach the M5 cage nuts or M5 rack nuts to the front rack pillar.

Note

- Use the M5 cage nuts if the rack pillar holes are square.
- Use the M5 rack nuts if the rack pillar holes are round.

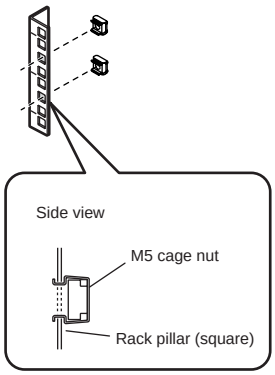
- Attachment positions

  On either side, insert four M5 cage nuts or M5 rack nuts in the 2nd and 5th holes above the blank panel base line.

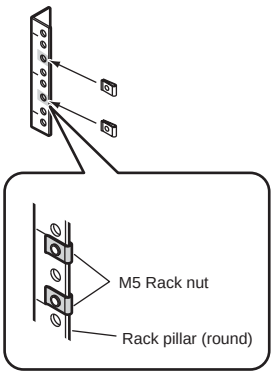


- Attachment procedure

M5 cage nut
Clip the cage nut tabs into the desired hole from the inside.



M5 rack nut
Clip the rack nut over the desired hole from the side.



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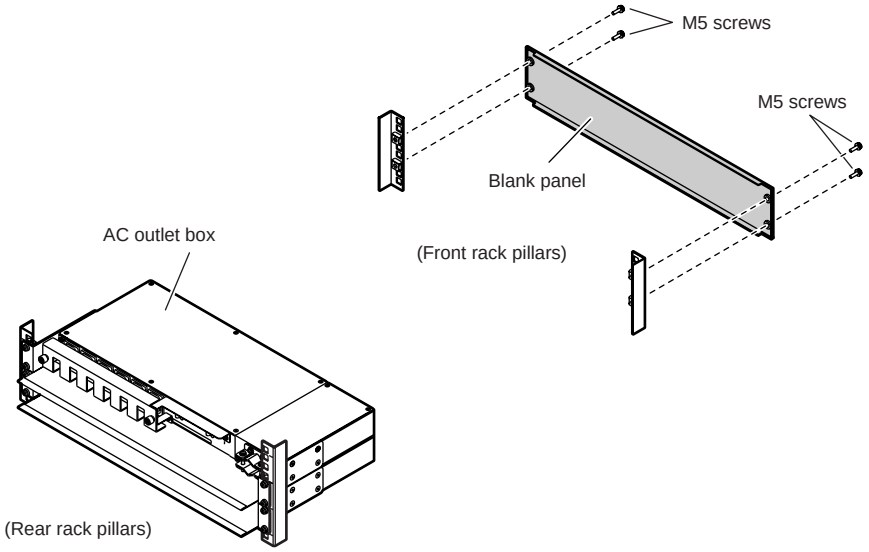
4-2 Fasten the blank panel to the prepared holes in the pillars with four M5 screws.



End of procedure

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Chapter 6 Cable Connection

This chapter explains how to connect various cables to the ETERNUS DX60/DX80/DX90.

CAUTION

Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.
- When the disk is brought from a cold to a warm place, there is a chance that the change in temperature can result in condensation forming on the magnetic platters. Wait for the disks to warm up to the local ambient temperature before turning the ETERNUS DX60/DX80/DX90 on.

6.1 Connection Preparation

The following preparations are required before connecting cables:

- Networking equipment
- Power related checks
- Remote support environment condition checks
- Related manuals

Networking equipment

Prepare the networking equipment to be connected to the ETERNUS DX60/DX80/DX90

❏ Networking equipment (such as a Fibre Channel switch and switching hub)

Power related checks

Refer to "5.1.2 Check the Number of Wall Outlets" (page 87) and check that the available power supply facilities meet the specified requirements.

❏ Number and specifications of the power outlets

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Remote support environment condition checks

If the remote support connection is to be independent of the customer network, the following components will also be required:

- ❏ LAN cables × 2 (enhanced Cat-5 twisted-pair type)
- ❏ Routers and other networking equipment

"ETERNUS DX60/DX80/DX90 Web GUI User Guide"

Related manuals

Prepare the following manuals:

- ❏ "ETERNUS DX60/DX80/DX90 Web GUI User Guide"
- ❏ Other related manuals, for example, for a server or networking equipment to be connected to the ETERNUS DX60/DX80/DX90.

6.2 LAN Cable Connection (for Operation Management)

This ETERNUS DX60/DX80/DX90 must be connected to a LAN to perform settings or maintenance operations via GUI or CLI, to monitor the device status, or when operating with remote support.
User must prepare their own LAN cables (enhanced Cat-5 twisted-pair type).

IMPORTANT

- The ETERNUS DX60/DX80/DX90 has two LAN ports (1000Base-T/100Base-TX/10Base-T, MNT port and RMT port) for each controller.
  - For device management via GUI or CLI, use MNT port.
    For dual controller model, only device monitoring and switching the Master CM (when an error occurs in the LAN environment) can be performed from the MNT port of Slave CM.
  - For remote support operation, use MNT port or RMT port. For remote support on a different network to the customer network, use the RMT port as the remote support port. For remote support over the customer network, only the MNT port need be used.
  - Operation using only the RMT port without the MNT port is not allowed.

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IMPORTANT

- The ETERNUS DX60/DX80/DX90 LAN ports operate by default in Auto-Negotiation mode, which recognizes 1000Base-T/100Base-TX/10Base-T, and Full duplex / Half duplex automatically.
  - When connecting networking equipment such as hubs and routers, check the specifications and settings of the equipment to be connected.
  - When the LAN ports of the device to be connected operate in Auto-Negotiation mode, the communication mode is set by the specified algorithm.
  - When the device cannot be recognized correctly, set both devices to be connected in Fix mode.
- When hub has Spanning Tree Protocol (STP) function and it is enabled, connection to the ETERNUS DX60/DX80/DX90 may fail. If failed, disable the STP function.
  - When STP function is not necessary for network configuration, disable the function for hub.
  - When STP function is necessary for network configuration, disable the STP function of the hub port or perform the Port-Fast setting only for the ETERNUS DX60/DX80/DX90 connection.

CAUTION

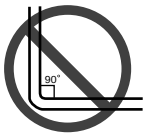
Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.

- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause damage.

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause device damage or failure.



Do not bend square

Do not bind up

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LAN cable connection procedure

The following explains how to connect the LAN cable.

IMPORTANT

- To help with LAN cable management and prevent incorrect connections, attach labels to the LAN cables and make a note of connection origins and destinations.
- When connecting LAN cables, check the connector orientation and then firmly push it all the way in.
  When disconnecting LAN cables, depress the tab, then pull out the connector.

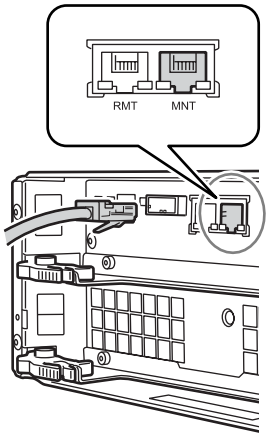
Note

This section describes dual controller model as an example. Note that there is only controller 0 (CM#0) for single controller model.

Procedure

1 Connect the LAN cable to the ETERNUS DX60/DX80/DX90.

Connect the LAN cable connectors to the MNT ports of the controller 0 (CM#0) and controller 1 (CM#1) for the ETERNUS DX60/DX80/DX90.



CAUTION

Do

- When connecting the LAN cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

2 Connect the LAN cables to the networking equipment.

Connect the other end of the LAN cable to the networking equipment, such as hub or router. For networking equipment connection details, refer to the documentation for the networking equipment being connected to.

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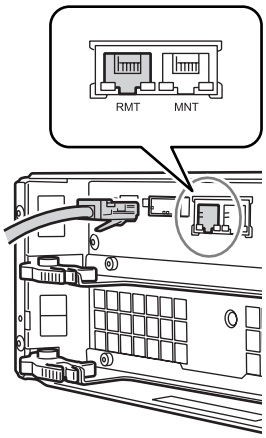
3 If the RMT ports are to be used, connect the LAN cables to RMT ports.

3-1 Connect the connector of the LAN cable to the RMT port of the controller 0 (CM#0) and controller 1 (CM#1).



3-2 Connect the other end of the LAN cable to the networking equipment, such as hub or router.
For networking equipment connection details, refer to the documentation for the networking equipment being connected to.

End of procedure

6.3 Fibre Channel Cable Connection (For Fibre Channel)

Connect the ETERNUS DX60/DX80/DX90 and the server or Fibre Channel switch with Fibre Channel cable.
User must prepare their own Fibre Channel cables.

CAUTION

Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.
- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause damage.
- Before connecting Fibre Channel cables, confirm that the connectors are clean and free of dust, oil, and grease, etc.

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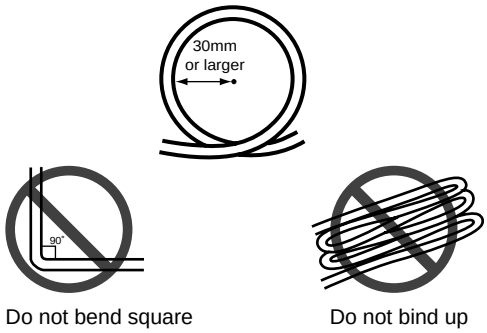
CAUTION

- Fibre Channel cable is thin and breaks easily, so be careful not to pinch the cable between devices or bend it too much. Keep a 30mm or larger radius when bending Fibre Channel cable. Failure to do so may cause device damage or failure.



Do not bend square　　Do not bind up

Fibre Channel cable connection procedure

The following explains how to connect the Fibre Channel cable.
This section explains how to connect the Fibre Channel cable to the ETERNUS DX60/DX80. For the ETERNUS DX90, each controller has four Fibre Channel ports.

IMPORTANT

- To help with Fibre Channel cable management and prevent incorrect connections, attach labels to the Fibre Channel cables and make a note of connection origins and destinations.
- When connecting the Fibre Channel cable, check the direction of the connector tab and insert it all the way in firmly.
  When disconnecting the Fibre Channel cable, pull out the connector while holding its tab.

Note

This section describes dual controller model as an example. Note that there is only controller 0 (CM#0) for single controller model.

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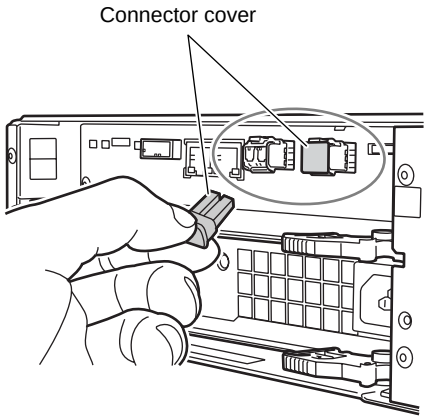
Procedure

1 Remove the connector cover of Fibre Channel port.

Remove the connector cover attached to the Fibre Channel port of the controller 0 (CM#0) or controller 1 (CM#1).

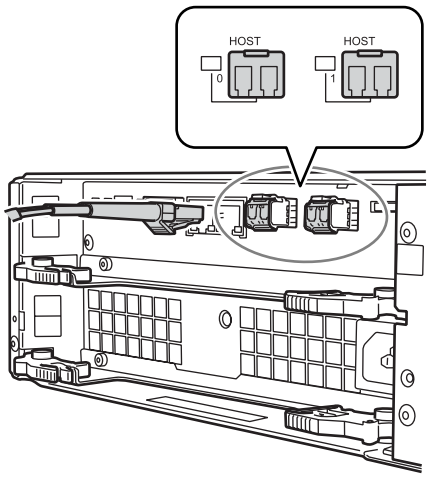


IMPORTANT	Keep the removed connector cover in a safe place where they will not be lost.

2 Connect the Fibre Channel cable to the ETERNUS DX60/DX80/DX90.

2-1 Remove the covers from the Fibre Channel cable connectors.

2-2 Insert the Fibre Channel cable connectors in the controller 0 (CM#0) and controller 1 (CM#1) Fibre Channel ports.



Copyright 2010 FUJITSU LIMITED

CAUTION

Do

- When connecting the Fibre Channel cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

3 Connect the other end of the Fibre Channel cable to the server or Fibre Channel switch.

3-1 Remove the covers from the Fibre Channel cable connectors.

3-2 Connect the Fibre Channel cable to the Fibre Channel adapter in the server or Fibre Channel switch.

End of procedure

6.4 LAN Cable Connection (For iSCSI)

Connect the ETERNUS DX60/DX80 and the server or switching hub with LAN cables (enhanced Cat-5 type).

User must prepare their own LAN cables.

IMPORTANT

- Use a separate LAN for the iSCSI connection.
- The iSCSI interface operates in 1000Base-T full-duplex mode.
- When connecting the ETERNUS DX60/DX80 and the server via a switching hub, the switching hub must be able to support 1Gbit/s connection.

CAUTION

Do

- Be sure to wear a wrist strap or discharge static electricity by touching the metal frame of the ETERNUS DX60/DX80 before starting each operation, as failure to discharge static electricity may cause device failure.
- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause device damage.

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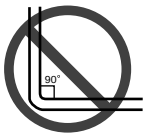
CAUTION

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause a device damage or failure.



Do not bend square

Do not bind up

LAN cable connection procedure

The following explains how to connect the LAN cable.

IMPORTANT

- To help with LAN cable management and prevent incorrect connections, attach labels to the LAN cables and make a note of connection origins and destinations.
- When connecting LAN cables, check the connector orientation and then firmly push it all the way in.
  When disconnecting LAN cables, depress the tab, then pull out the connector.

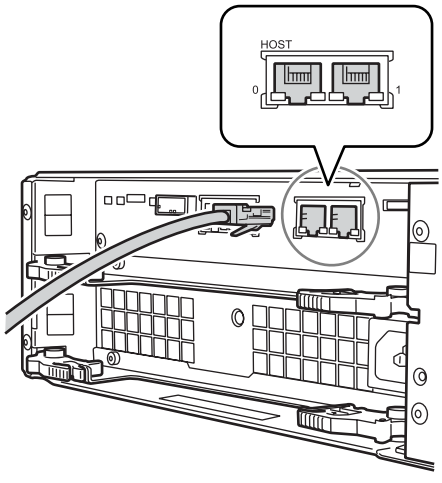
Note

This section describes dual controller model as an example. Note that there is only controller 0 (CM#0) for single controller model.

Procedure

1 Connect the LAN cable to the ETERNUS DX60/DX80.

Insert the LAN cable connectors in the controller 0 (CM#0) and controller 1 (CM#1) iSCSI ports.



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CAUTION

Do

- When connecting the LAN cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

2 Connect the LAN cables to the server or switching hub.

Connect the other end of the LAN cable to the server's LAN card or iSCSI HBA, or to the switching hub. For switching hub connection details, refer to the documentation for the switching hub being connected to.

End of procedure

6.5 MiniSAS Cable Connection (For SAS)

Connect the ETERNUS DX60/DX80 and the server with miniSAS cables.

User must prepare their own miniSAS cables (ETERNUS DX60/DX80 connector: SFF8088).

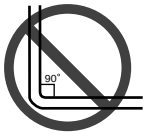
CAUTION

Do

- Be sure to wear a wrist strap or discharge static electricity by touching the metal frame of the ETERNUS DX60/DX80 before starting each operation, as failure to discharge static electricity may cause device failure.
- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause device damage.

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause a device damage or failure.



Do not bend square

Do not bind up

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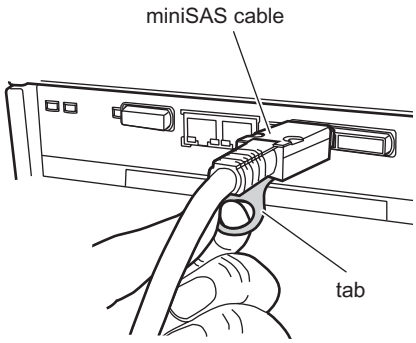
MiniSAS cable connection procedure

The following explains how to connect the miniSAS cable.

IMPORTANT

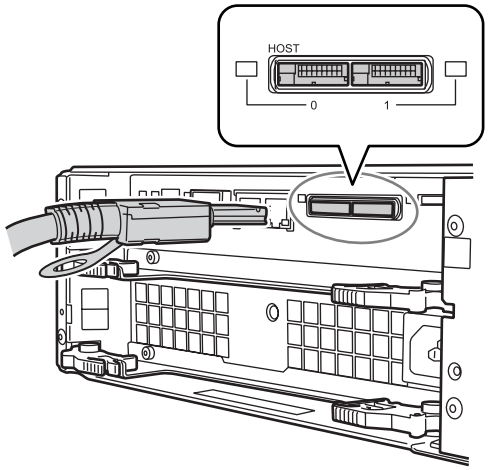
- To help with miniSAS cable management and prevent incorrect connections, attach labels to the miniSAS cables and make a note of connection origins and destinations.
- When connecting miniSAS cables, check the connector orientation and then firmly push it all the way in.
  When disconnecting miniSAS cables, use the pull-tab to extract the connector.



Procedure

1 Connect the miniSAS cables to the ETERNUS DX60/DX80.

Insert the miniSAS cable connectors in the controller 0 (CM#0) and controller 1 (CM#1) SAS ports.



IMPORTANT Do not connect this cable to the SAS (OUT) port.

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CAUTION

Do

- When connecting the SAS cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

2 Connect the miniSAS cables to the server.
Connect the other end of the miniSAS cables to the server's SAS cards.

End of procedure

6.6 MiniSAS Cable Connection (For Drive Enclosures)

When a Drive Enclosure is installed, connect the Drive Enclosure to the Controller Enclosure with a miniSAS cable. When multiple Drive Enclosures are installed (only for ETERNUS DX80/DX90), connect the Drive Enclosures with miniSAS cable.
Two miniSAS cables (75cm) are supplied with each Drive Enclosure dual expander model, and one miniSAS cable (75cm) with each Drive Enclosure single expander model.

CAUTION

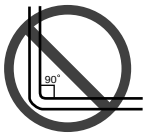
Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.

- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause device damage.

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause a device damage or failure.



Do not bend square

Do not bind up

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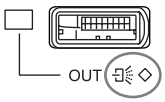
MiniSAS cable connection procedure

The following explains how to connect the miniSAS cable.

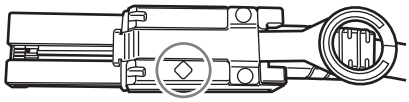
IMPORTANT

- To help with miniSAS cable management and prevent incorrect connections, attach labels to the miniSAS cables and make a note of connection origins and destinations.
- When connecting miniSAS cables, always check the symbols on the connector and port are matching.
  - SAS (OUT) of CE or DE: Attach the connector with the ◇ symbol to the port with the ◇ symbol.

SAS (OUT) port

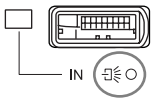


Plug connecting to SAS (OUT) port

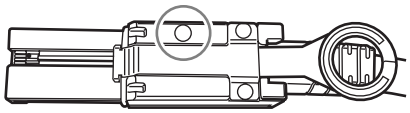


  - SAS (IN) of DE: Attach the connector with the ○ symbol to the port with the ○ symbol.

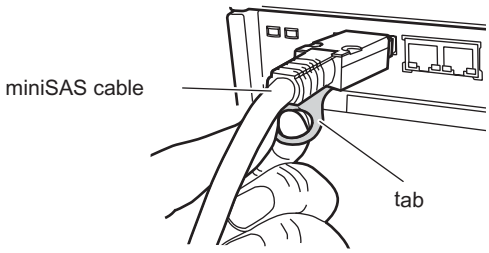
SAS (IN) port



Plug connecting to SAS (IN) port



- When connecting miniSAS cables, check the connector orientation and then firmly push it all the way in.
  When disconnecting miniSAS cables, use the pull-tab to extract the connector.



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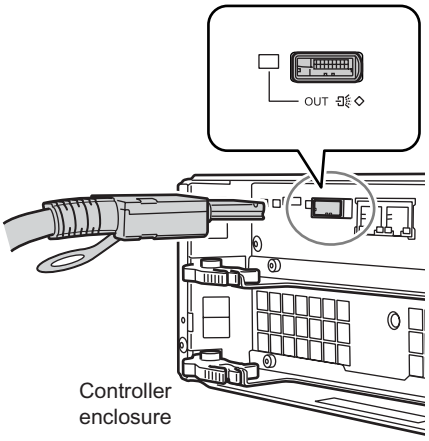
Procedure

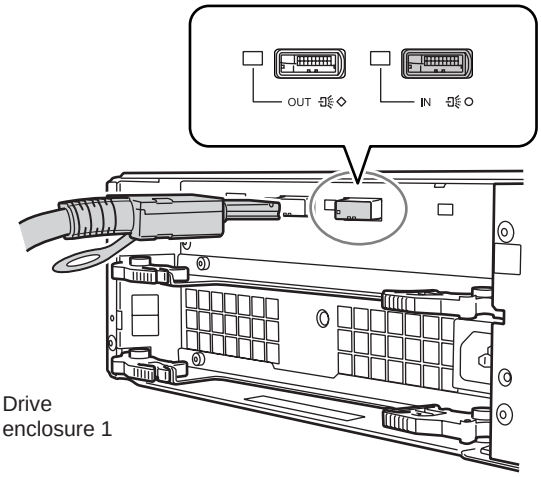
1 Connect the controller enclosure to the drive enclosure with the miniSAS cable.

1-1 Connect the SAS (OUT) port at controller 0 (CM#0) of controller enclosure, to the SAS (IN) port at expander 0 (EXP#0) of the drive enclosure 1 with the miniSAS cable.

(1) Connect the plug to be connected to SAS (OUT) port, to the SAS (OUT) port of the controller 0 (CM#0).
Remove the port cover from the SAS (OUT) port before inserting the plug.



(2) Connect the plug to be connected to SAS (IN) port, to the SAS (IN) port of the expander 0 (EXP#0).



1-2 For dual controller model, connect the SAS (OUT) port at controller 1 (CM#1) of controller enclosure, to the SAS (IN) port at expander 1 (EXP#1) of the drive enclosure 1 with the miniSAS cable.
Connect the miniSAS cable in the same way as Step 1-1.

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The following shows the miniSAS connection figure between controller enclosure and drive enclosure.

IMPORTANT Do not connect anything to the SAS (OUT) port on the end edge.

- For single controller model

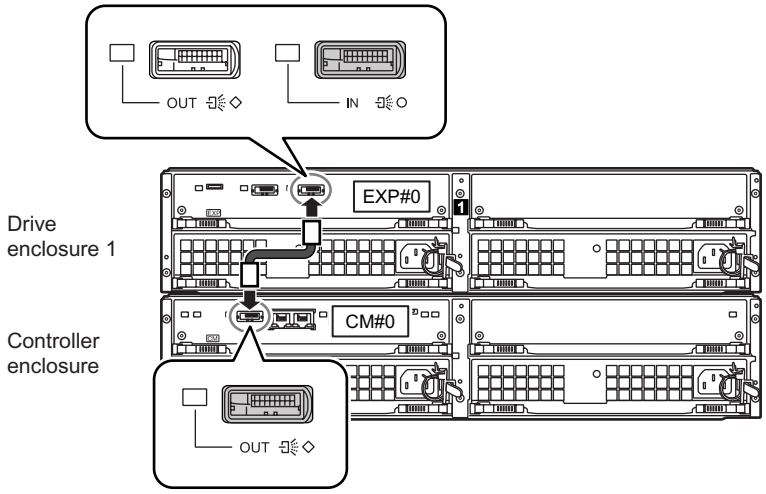

Figure 6.1 MiniSAS cable connection (between the controller enclosure and drive enclosure) (single controller model)

- For dual controller model

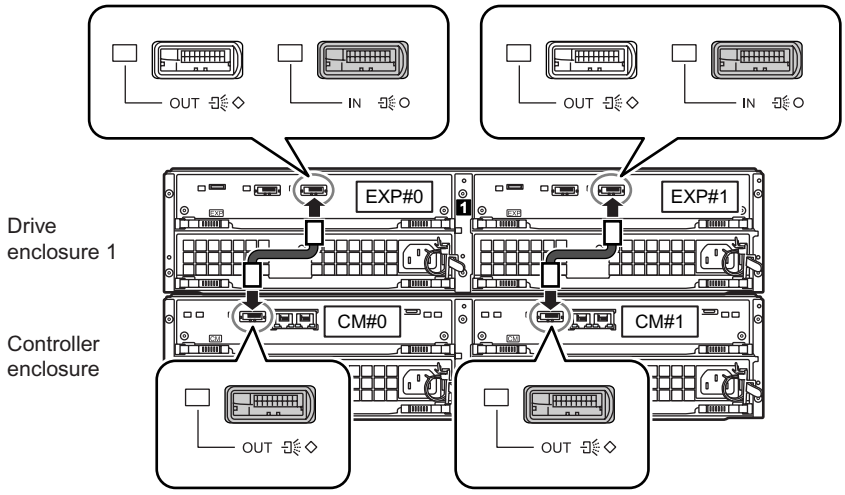

Figure 6.2 MiniSAS cable connection (between the controller enclosure and drive enclosure) (dual controller model)

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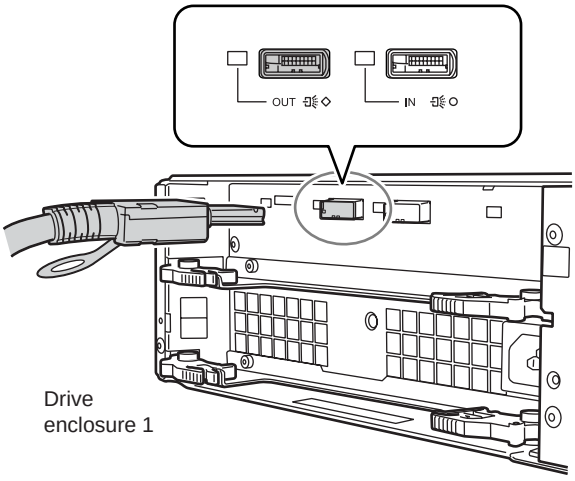
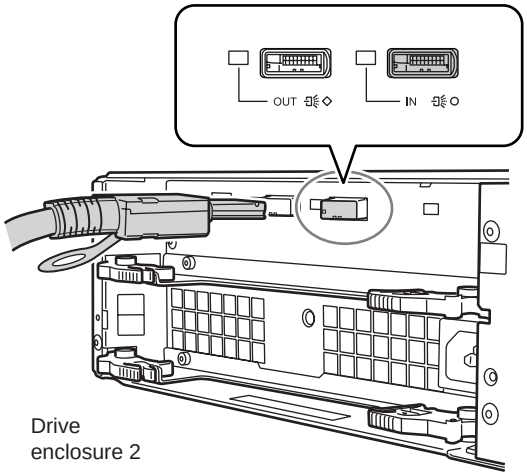
2 When two or more drive enclosures are installed, connect the drive enclosures with the miniSAS cable.

2-1 Connect the SAS (OUT) port at expander 0 (EXP#0) of the drive enclosure 1, to the SAS (IN) port at expander 0 (EXP#0) of the drive enclosure 2 with the miniSAS cable.

(1) Connect the plug to be connected to the SAS (OUT) port, to the SAS (OUT) port of the expander 0 (EXP#0) for the drive enclosure 1.



(2) Connect the connector to be connected to the SAS (IN) port, to the SAS (IN) port of the expander 0 (EXP#0) for the drive enclosure 2.



2-2 For dual controller model, connect the SAS (OUT) port at expander 1 (EXP#1) of the drive enclosure 1, to the SAS (IN) port at expander 1 (EXP#1) of the drive enclosure 2 with the miniSAS cable.
Connect the miniSAS cable in the same way as Step 2-1.

The following figure shows the miniSAS connection figure between drive enclosures.

IMPORTANT Do not connect anything to the SAS (OUT) port on the end edge.

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- For single controller model

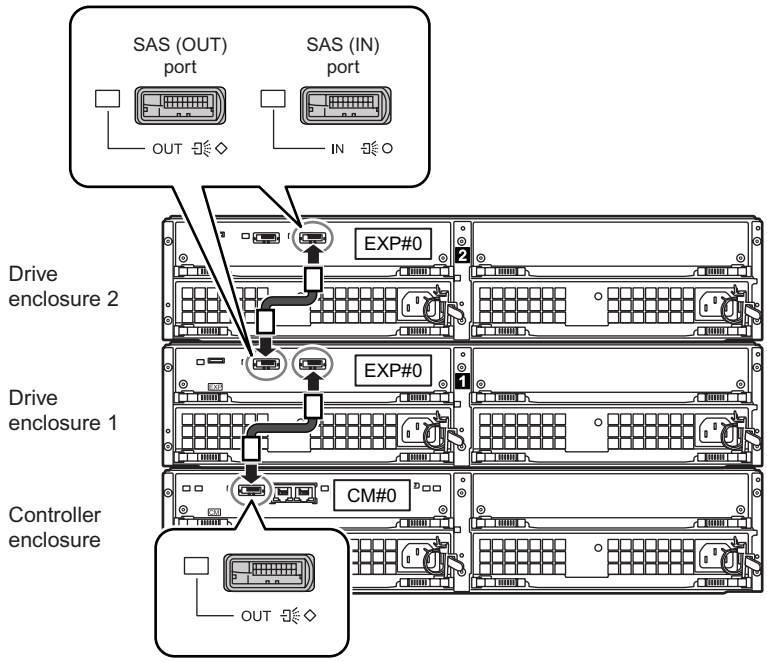

Figure 6.3 MiniSAS cable connection
(When two or more drive enclosures are added) (single controller model)

- For dual controller model

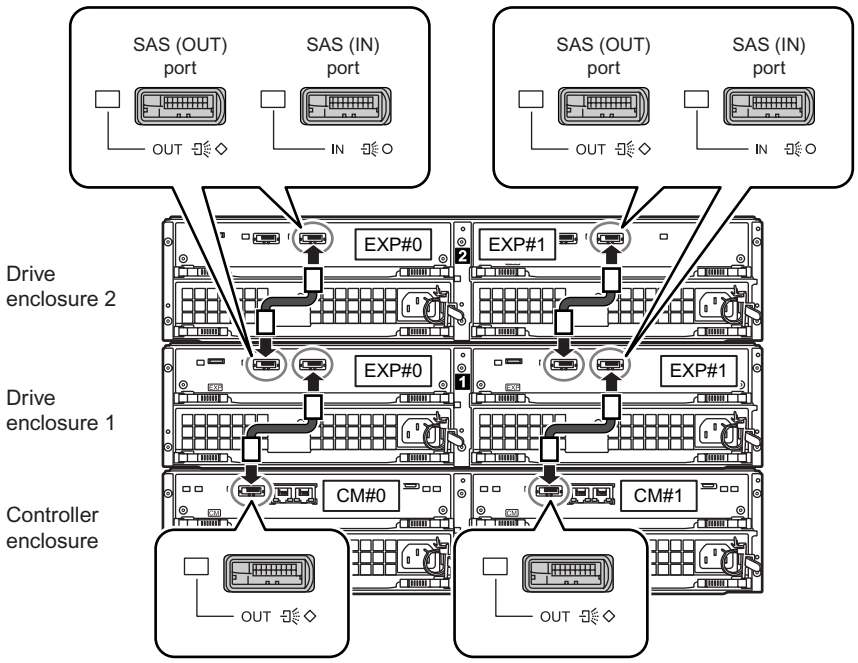

Figure 6.4 MiniSAS cable connection
(When two or more drive enclosures are added) (dual controller model)

End of procedure

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6.7 Power Cord Connection

Connect the power cords to the ETERNUS DX60/DX80/DX90.

WARNING

Do Not

- Do not disconnect the power cord plug with wet hands as it may lead to fire or electrical shock.
- Do not attempt to repair a damaged power cord. Do not pull on, excessively bend/twist, apply heat or place heavy objects on the cord. Doing so will damage the cord, which may lead to fire or electrical shock.
- Do not put the stress on the root of the power cord, for example, by twisting it. Doing so may expose or cut the cable core of the power cord, causing fire or electric shock
- Do not use the power cord if it is damaged or the plug does not snugly fit into the socket as it may cause fire or electrical shock.
- Do not use a power cord other than one attached, or the one specified. Do not use the attached power cord or specified power cord for other devices. Doing so may cause failure, fire, or electric shock.

Do

- Wipe clean any excess dust from the plug prongs or socket with a dry cloth. Failure to do so, may lead to fire or electrical shock.

CAUTION

Ground

- Use a power cord with ground lead. Using a power cord without ground lead may cause fire, electric shock, or malfunction.

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6.7.1 With No AC Outlet Box

The following explains how to connect the power cords when no AC outlet boxes are installed. Two power cords (4m) are provided for each enclosure.

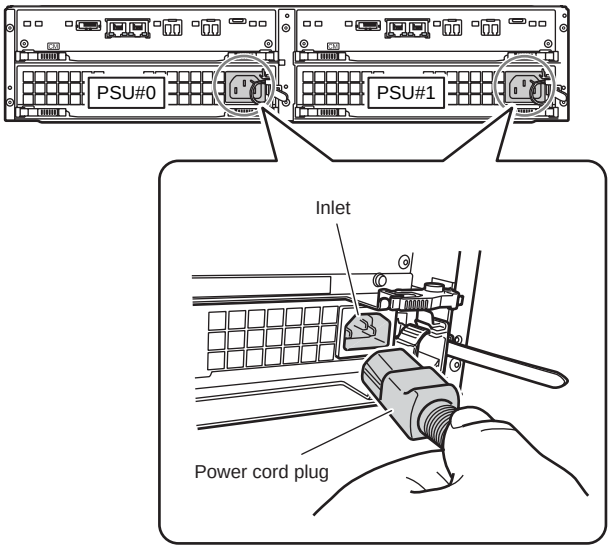
IMPORTANT To help with power cord management and prevent incorrect connections, attach labels to the power cords and make a note of connection origins and destinations.

Procedure

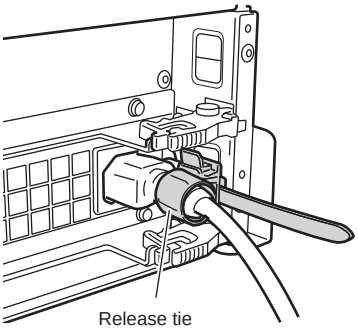
1 Connect the power cords to the ETERNUS DX60/DX80/DX90.

IMPORTANT Each enclosure has two power supply units (PSU#0 and PSU#1). The power cords must be connected to the inlets of both power supply units.

1-1 Connect the power cord plugs to the power inlets of the Power Supply Units.



1-2 Attach the release tie to the plug of the power outlet for the power plug not to be unplugged.



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2 Connect the power cords to the power outlet.

Connect the plug at the other end of each power cord to the power outlet.

IMPORTANT

- Connecting the power cords to different power systems, on the PSU#0 and PSU#1 sides respectively, prevents power supply facility failures.
- After unplugging the power cord, wait until the POWER STATUS LED of the power supply unit has turned off completely before reconnecting it.
  (It takes about ten seconds for the STATUS LED to be turned off completely.)

WARNING

- Do not connect power cords or other cables during thunderstorms, as lightning can result in fire or electric shock.

CAUTION

- Be sure to fully insert each plug into its socket. Failure to do so may lead to fire or electrical shock.

- When disconnecting the power plug, be sure to pull from the plug and not the cord. Pulling the cord may expose or snap the inner wires, which can lead to fire or electrical shock.
- Do not use the server service outlet to connect the device power cord.
- Do not overload an electrical outlet. Doing so may lead to electric shock or fire.

- If the ETERNUS DX60/DX80/DX90 is not going to be used for a long period of time, it is advisable to unplug all power cords to avoid any chance of fire to the ETERNUS DX60/DX80/DX90 and its peripherals.

End of procedure

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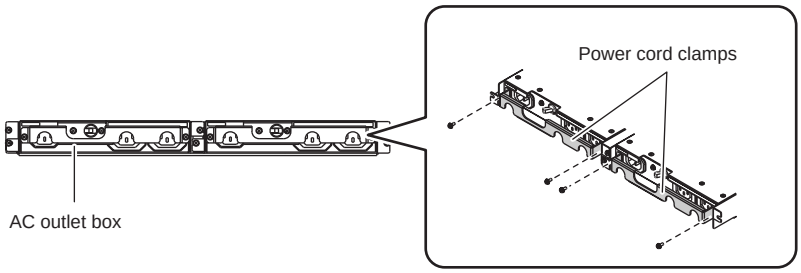
6.7.2 When 1U AC Outlet Box is Installed

The following explains how to connect the power cord when 1U AC outlet box is installed.

IMPORTANT	To help with power cord management and prevent incorrect connections, attach labels to the power cords and make a note of connection origins and destinations.

Procedure

1 Remove the power cord clamps from the AC outlet box.



2 Connect the AC outlet box outlets and power supply unit inlets with power cord (AC output cables) (4m).

The procedures to connect the power supply unit is the same as the Step 1 in "6.7.1 With No AC Outlet Box" (page 124).

IMPORTANT	Each enclosure has two power supply units (PSU#0 and PSU#1). The power cords must be connected to the inlets of both power supply units.

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The following table and figure show the connection path of an AC outlet cable and connection figure respectively

Table 6.1 Connection path of a power cord (AC output cable) (AC outlet box (1U))

Connection source (AC outlet box outlet)		Connection distribution (power supply unit inlet)
The first ACS	OUTPUT #0 - 1	Controller enclosure PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 1 PSU#0 inlet
	OUTPUT #1 - 1	Controller enclosure PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 1 PSU#1 inlet
The second ACS	OUTPUT #0 - 1	Drive enclosure 2 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 3 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 2 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 3 PSU#1 inlet
The third ACS	OUTPUT #0 - 1	Drive enclosure 4 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 5 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 4 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 5 PSU#1 inlet
The fourth ACS	OUTPUT #0 - 1	Drive enclosure 6 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 7 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 6 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 7 PSU#1 inlet
The fifth ACS	OUTPUT #0 - 1	Drive enclosure 8 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 9 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 8 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 9 PSU#1 inlet

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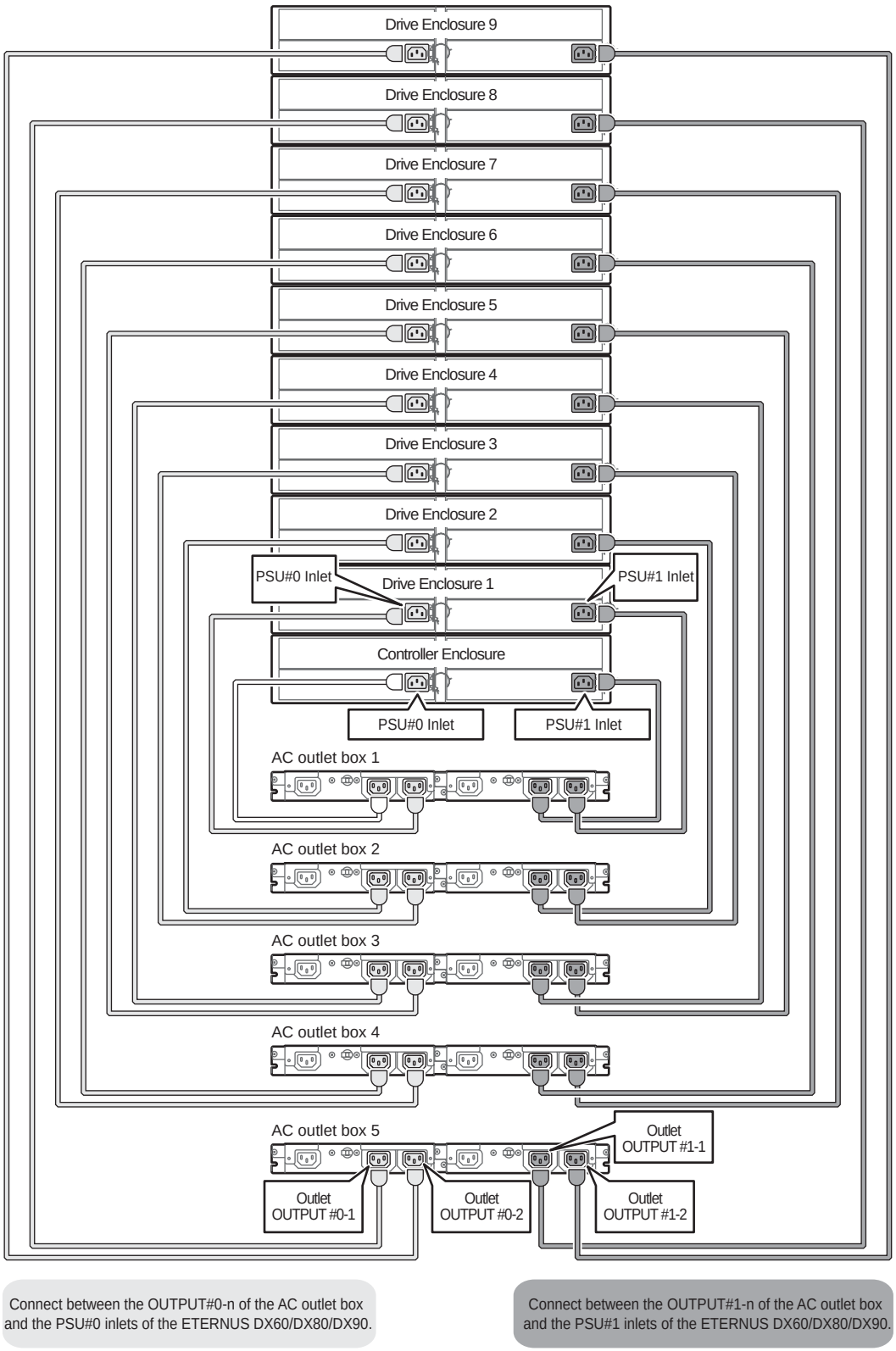
Drive Enclosure 9
Drive Enclosure 8
Drive Enclosure 7
Drive Enclosure 6
Drive Enclosure 5
Drive Enclosure 4
Drive Enclosure 3
Drive Enclosure 2
PSU#0 Inlet
Drive Enclosure 1
PSU#1 Inlet
Controller Enclosure
PSU#0 Inlet
PSU#1 Inlet
AC outlet box 1
AC outlet box 2
AC outlet box 3
AC outlet box 4
AC outlet box 5
Outlet OUTPUT #1-1
Outlet OUTPUT #0-1
Outlet OUTPUT #0-2
Outlet OUTPUT #1-2
Connect between the OUTPUT#0-n of the AC outlet box and the PSU#0 inlets of the ETERNUS DX60/DX80/DX90.
Connect between the OUTPUT#1-n of the AC outlet box and the PSU#1 inlets of the ETERNUS DX60/DX80/DX90.

Figure 6.5 Connection of AC output cables (1U AC outlet box)

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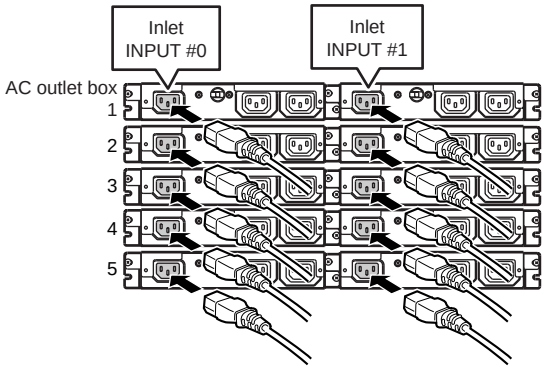
3 Connect the power cords (AC input cables) (4m) supplied with the AC outlet box to the inlet of the AC outlet box.



4 Use the power cord clamps to prevent the power plugs from coming unplugged.
Attach the power clamps removed in Step 1.

5 Connect the plug at the other end of each of the power cords (AC input cables) (4m) connected in Step 3 to the outlet.

IMPORTANT Connecting the power cords (AC input cables) to different power systems, on the INPUT#0 and INPUT#1 sides respectively, prevents power supply facility failures.

WARNING

Do Not

- Do not connect power cords or other cables during thunderstorms, as lightning can result in fire or electric shock.

CAUTION

Do

- Be sure to fully insert each plug into its socket. Failure to do so may lead to fire or electrical shock.

Do Not

- When disconnecting the power plug, be sure to pull from the plug and not the cord. Pulling the cord may expose or snap the inner wires, which can lead to fire or electrical shock.
- Do not use the server service outlet to connect the device power cord.

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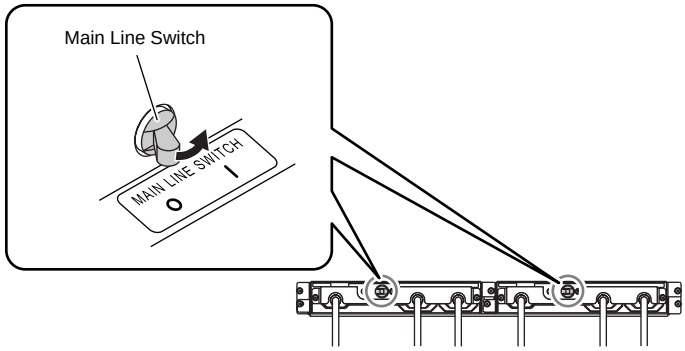
CAUTION

- Do not overload an electrical outlet. Doing so may lead to electric shock or fire.

- If the ETERNUS DX60/DX80/DX90 is not going to be used for a long period of time, it is advisable to unplug all power cords to avoid any chance of fire to the ETERNUS DX60/DX80/DX90 and its peripherals.

6 Turn the main line switch of the AC outlet box to the "On" position (marked "I").



IMPORTANT

When turning the main line switch to "On" (marked "I") right after turning the main line switch to "Off" (marked "O"), turn it back to "On" (marked "I") after the STATUS LED of the power supply unit has turned off completely.
(It takes about ten seconds for the POWER STATUS LED to be turned off completely.)

End of procedure

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6.7.3 When 2U AC Outlet Box is Installed

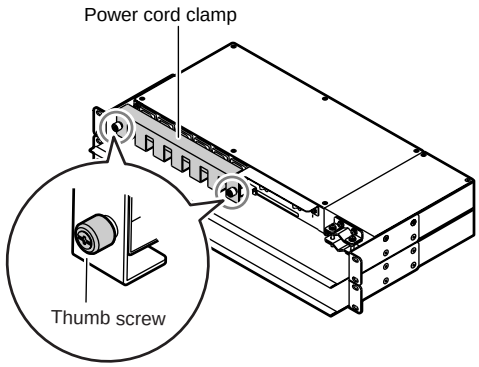
The following explains how to connect the power cord when 2U AC outlet box is installed.

IMPORTANT	To help with power cord management and prevent incorrect connections, attach labels to the power cords and make a note of connection origins and destinations.

Procedure

1 Remove the power cord clamp from the AC outlet box.

Loosen the two thumb screws on both sides of the power cord clamp to remove it.



2 Connect the AC outlet box outlets and power supply unit inlets with power cord (AC output cables) (4m).

The procedures to connect the power supply unit is the same as the Step 1 in "6.7.1 With No AC Outlet Box" (page 124).

IMPORTANT	Each enclosure has two power supply units (PSU#0 and PSU#1). The power cords must be connected to the inlets of both power supply units.

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The following table and figure show the connection path of an AC outlet cable and connection figure respectively

Table 6.2 Connection path of a power cord (AC output cable) (AC outlet box (2U))

Connection source (AC outlet box outlet)		Connection distribution (power supply unit inlet)
AC outlet box A	OUT1	Controller enclosure PSU#0 inlet
	OUT2	Drive enclosure 1 PSU#0 inlet
	OUT3	Drive enclosure 2 PSU#0 inlet
	OUT4	Drive enclosure 3 PSU#0 inlet
	OUT5	Drive enclosure 4 PSU#0 inlet
	OUT6	Drive enclosure 5 PSU#0 inlet
AC outlet box B	OUT1	Controller enclosure PSU#1 inlet
	OUT2	Drive enclosure 1 PSU#1 inlet
	OUT3	Drive enclosure 2 PSU#1 inlet
	OUT4	Drive enclosure 3 PSU#1 inlet
	OUT5	Drive enclosure 4 PSU#1 inlet
	OUT6	Drive enclosure 5 PSU#1 inlet
AC outlet box C	OUT1	Drive enclosure 6 PSU#0 inlet
	OUT2	Drive enclosure 7 PSU#0 inlet
	OUT3	Drive enclosure 8 PSU#0 inlet
	OUT4	Drive enclosure 9 PSU#0 inlet
AC outlet box D	OUT1	Drive enclosure 6 PSU#1 inlet
	OUT2	Drive enclosure 7 PSU#1 inlet
	OUT3	Drive enclosure 8 PSU#1 inlet
	OUT4	Drive enclosure 9 PSU#1 inlet

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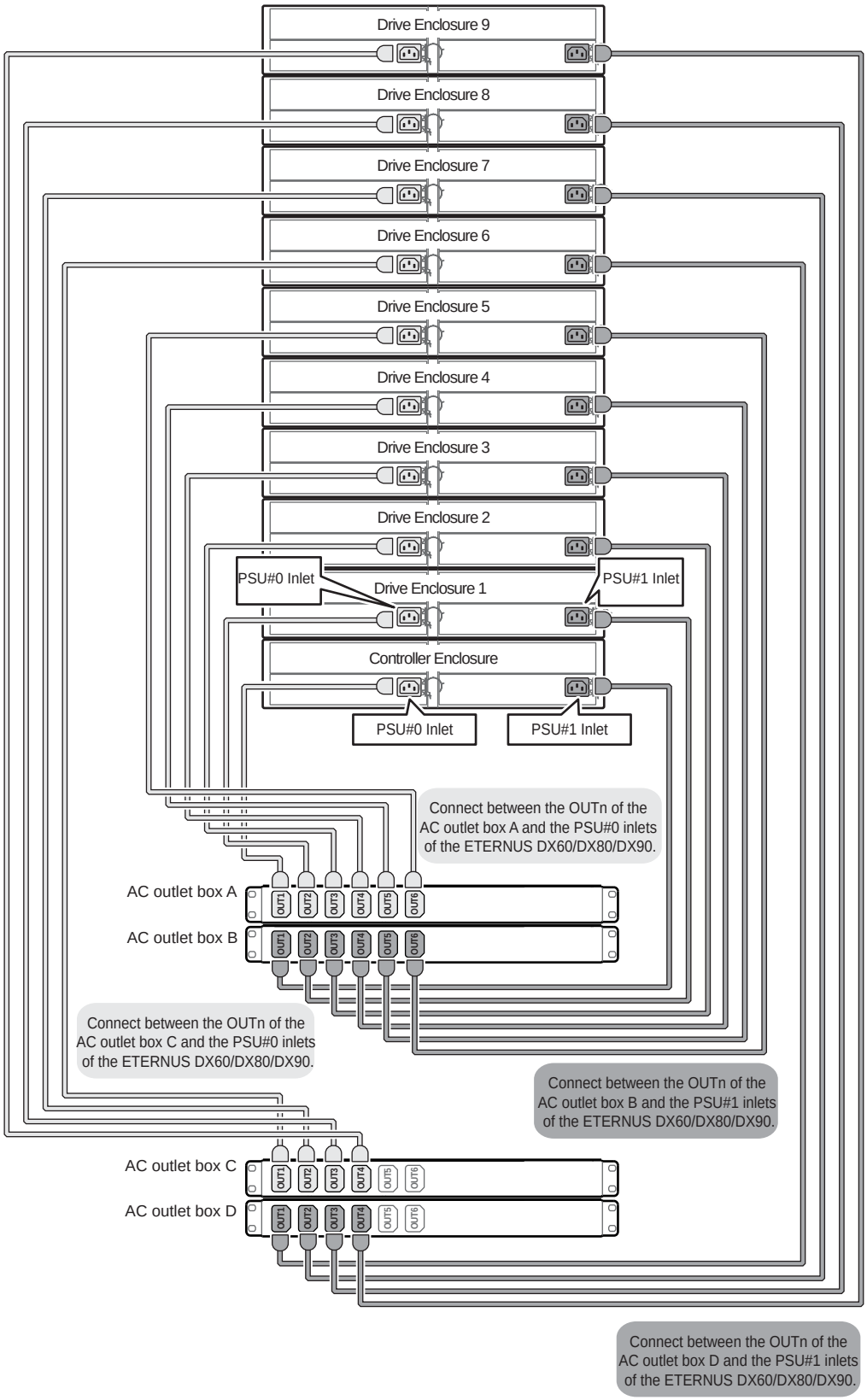
Drive Enclosure 9
Drive Enclosure 8
Drive Enclosure 7
Drive Enclosure 6
Drive Enclosure 5
Drive Enclosure 4
Drive Enclosure 3
Drive Enclosure 2
PSU#0 Inlet
PSU#1 Inlet
Drive Enclosure 1
Controller Enclosure
PSU#0 Inlet
PSU#1 Inlet
Connect between the OUTn of the AC outlet box A and the PSU#0 inlets of the ETERNUS DX60/DX80/DX90.
AC outlet box A
AC outlet box B
Connect between the OUTn of the AC outlet box C and the PSU#0 inlets of the ETERNUS DX60/DX80/DX90.
Connect between the OUTn of the AC outlet box B and the PSU#1 inlets of the ETERNUS DX60/DX80/DX90.
AC outlet box C
AC outlet box D
Connect between the OUTn of the AC outlet box D and the PSU#1 inlets of the ETERNUS DX60/DX80/DX90.

Figure 6.6 Connection of AC output cables (2U AC outlet box)

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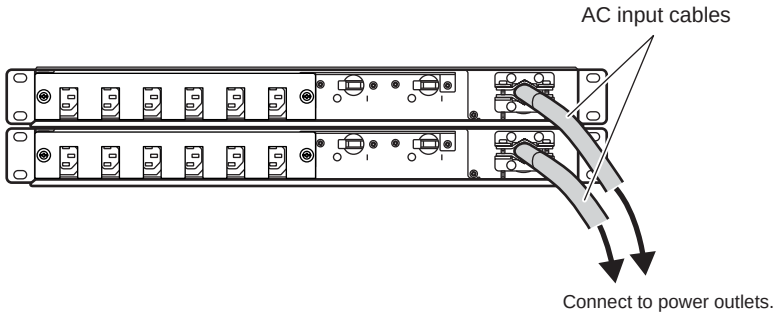
3 Use the power cord clamps to prevent the power plugs from coming unplugged.
Attach the power cord clamps removed in Step 1.

4 Connect the power cords (AC input cables) (4m) supplied with the AC outlet box to the inlet of the AC outlet box.

Note
The AC outlet box is shipped with the power cord connected to the inlets.

IMPORTANT
Connecting the power cords (AC input cables) to different power systems, on the AC outlet box A and C, and the AC outlet box B and D sides respectively, prevents power supply facility failures.



WARNING

Do Not

- Do not connect power cords or other cables during thunderstorms, as lightning can result in fire or electric shock.

CAUTION

Do

- Be sure to fully insert each plug into its socket. Failure to do so may lead to fire or electrical shock.

Do Not

- When disconnecting the power plug, be sure to pull from the plug and not the cord. Pulling the cord may expose or snap the inner wires, which can lead to fire or electrical shock.
- Do not use the server service outlet to connect the device power cord.

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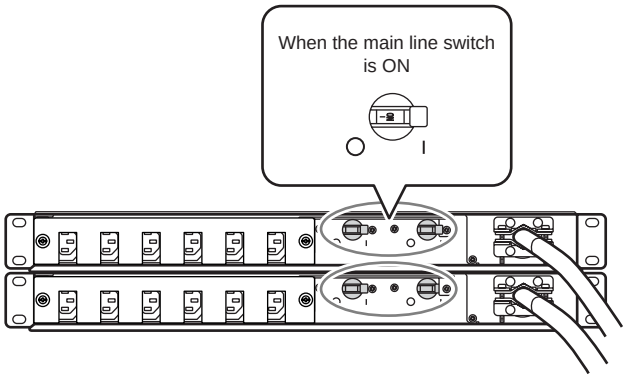
- Do not overload an electrical outlet. Doing so may lead to electric shock or fire.

CAUTION

- If the ETERNUS DX60/DX80/DX90 is not going to be used for a long period of time, it is advisable to unplug all power cords to avoid any chance of fire to the ETERNUS DX60/DX80/DX90 and its peripherals.

5 Turn the main line switch of the AC outlet box to the "ON" position (marked "I").



IMPORTANT

When turning the main line switch to "On" (marked "I") right after turning the main line switch to "Off" (marked "O"), turn it back to "On" (marked "I") after the STATUS LED of the power supply unit has turned off completely.
(It takes about ten seconds for the STATUS LED to be turned off completely.)

End of procedure

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Chapter 7 Setup

This chapter explains how to set up the ETERNUS DX60/DX80/DX90.

7.1 Setup Preparation

The following preparations are required before starting the ETERNUS DX60/DX80/DX90 setup:

- Related manuals
- Network setting information
- Completing and attaching the Network Settings label
- Preparation and settings for the PC

Related manuals

Prepare the following manuals:

❏ "ETERNUS DX60/DX80/DX90 Web GUI User Guide"

❏ "ETERNUS DX Disk storage systems Server Connection Guide"

❏ Other related manuals, for example, for a server or networking equipment to be connected to the ETERNUS DX60/DX80/DX90.

Network setting information

Determine the following network settings:

❏ IP address and subnet mask for the ETERNUS DX60/DX80/DX90's MNT port of Master CM (required)

Default IP address: 192.168.1.1
Default subnet mask 255.255.255.0

Note

For the dual controller model, the controller through which the ETERNUS DX60/DX80/DX90 is set up and operated is called the "Master CM", while the other controller is called the "Slave CM".
The single controller model only has a "Master CM" controller.

❏ IP address and subnet mask for the ETERNUS DX60/DX80/DX90's MNT port of Slave CM

No default value is set.
This setting is required when enabling the MNT port of a Slave CM for dual controller model.

Note

For dual controller model, from the MNT port of Slave CM, the device status can be displayed, and a Master CM is switched to a Slave CM.

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❏ IP address and subnet mask for the ETERNUS DX60/DX80/DX90's RMT port

No default value is set.
This setting is required if the remote support connection is to be independent of the customer network.
When enabling the RMT port of a Slave CM for dual controller model, two IP addresses are required.

❏ Gateway IP address

No default value is set.

❏ IP address for maintenance work

Prepare an IP address for maintenance work.

IMPORTANT	The ETERNUS DX60/DX80/DX90 can be reset to the factory default network settings by pressing the Controller Enclosure's IP RESET Switch twice in succession within a two second interval.

Completing and attaching the Network Settings label

Complete the network setting information in the provided Network Settings label and attach it on the ETERNUS DX60/DX80/DX90.

❏ Completing the Network Settings label

Complete the following items in the Network Settings label.

- IP address of MNT port
  IP address of the device MNT port
- IP address of FST
  IP address for maintenance work
- Subnet Mask
  Subnet mask of network connected
- IP address of RMT port
  IP address of the device RMT port

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❏ Attaching the Network Settings label

Attach the completed Network Settings label on the label plate in the label holder on the rear upper side.

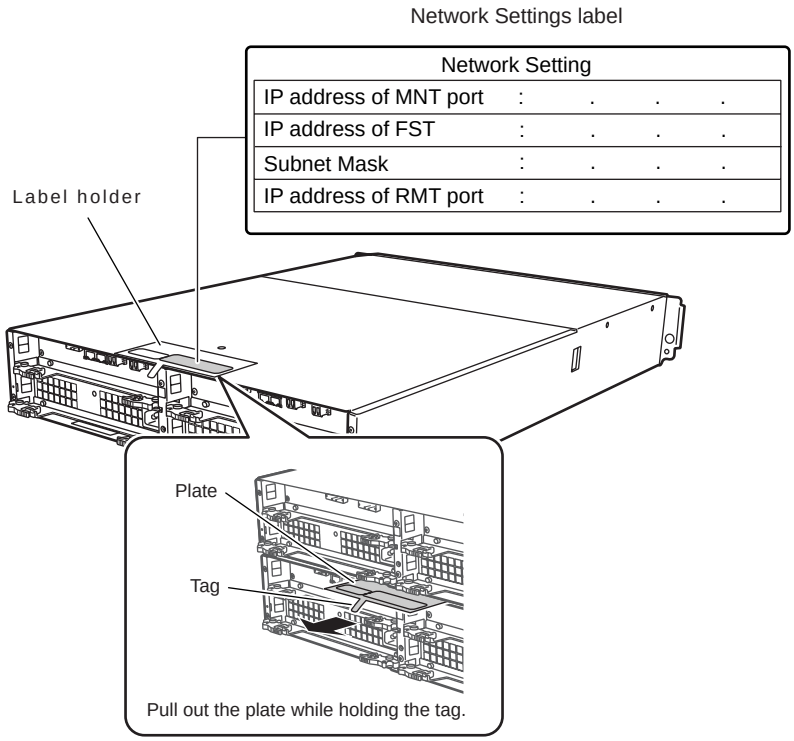
Network Settings label
Network Setting
IP address of MNT port : . . .
IP address of FST : . . .
Subnet Mask : . . .
IP address of RMT port : . . .
Label holder
Plate
Tag
Pull out the plate while holding the tag.

Figure 7.1 Network Settings label attachment

Preparation and settings for the PC

The initial settings are performed by using a Web browser running on a LAN connected PC. Prepare and set up the PC.

❏ Preparing the PC

Prepare the PC with the following settings and requirements.

- Web browser
  Usable Web browsers are as follows. Using Web browsers other than the following is possible, but proper operation cannot be guaranteed.
  - Microsoft® Internet Explorer 6.0, 7.0, 8.0
  - Mozilla Firefox™ 3.0.x, 3.5.x, 3.6.x
- Resolution
  1024 × 768 or greater

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"

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❏ Settings for the PC

Perform the following procedure to set up the PC.

Procedure

1 Set the IP address and subnet mask of the PC.

Set the following values.

IP address: 192.168.1.2
Subnet mask: 255.255.255.0

2 Check the settings of the Web browser.

Proxy server and Cache: Disable
Java Script, style sheets, and cookies: Enable

3 Connect the PC to the MNT port of the ETERNUS DX60/DX80/DX90 Controller 0 (CM#0) directly with a LAN cable (for operation management).

When a LAN cable (for operation management) is connected to Controller 1 (CM#1), disconnect it.

End of procedure

7.2 Basic Setup

This section explains how to perform the basic setup for the ETERNUS DX60/DX80/DX90.

Turning on the ETERNUS DX60/DX80/DX90

Turn on the ETERNUS DX60/DX80/DX90 before starting setup.
For details on how to turn on the ETERNUS DX60/DX80/DX90, refer to "3.1 Power ON Control" (page 72).

When checking the connection between the PC and the ETERNUS DX60/DX80/DX90, execute the "ping" command at the PC command prompt.
The following is an example of ping execution: ("192.168.1.1" is the default IP address)

```
ping 192.168.1.1
```

If the execution results in error, check the PC's network settings.

Note

If communication fails even though the MNT port of controller 0 (CM#0) and the LAN port of the PC are connected, check that Master LED of controller 0 (CM#0) is lit. If the Master LED of controller 1 (CM#1) is lit for dual controller model, use the MNT port of controller 1 (CM#1).

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7.2.1 Initial Setup

Start Graphical User Interface (GUI) from the Web browser of the connected PC, and perform the initial setup of the ETERNUS DX60/DX80/DX90 in the following order.

- Set Date and Time
- Set Storage System Name
- Change Password
- Modify FC Port Mode (Only for ETERNUS DX90)
- Set Port Parameters
- Setup Network Environment

The initial setup procedure is as follows: For the setup details, refer to "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

"ETERNUS DX60/DX80/DX90 Web GUI User Guide"

Procedure

1 Start the Initial Setup.

1-1 Start the Web browser on the PC.

1-2 Enter either of the following URLs in the address bar of the Web browser.

```
http://192.168.1.1/
```

or

```
https://192.168.1.1/
```

The logon screen of GUI appears.

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Note

The confirmation screens for site certification may be displayed when starting up GUI using SSL (https).
However, this should not cause any problems. Accept the site certification and continue the process.
The following shows an example when using Internet Explorer 7.
The display contents vary according to your web browser.

> There is a problem with this website's security certificate.
> The security certificate presented by this website was not issued by a trusted certificate authority.
> Security certificate problems may indicate an attempt to fool you or intercept data you send to the server.
> We recommend that you close this webpage and do not continue to this Web site.

The warning for the site certification is not displayed after installing the certification.
For the procedure about site certification installation, refer to "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

1-3 On the logon screen, select the language (English or Japanese).

1-4 Type the following User name and Password, and click the [Logon] button.
User name: root
Password: root (default)

After logging on, the Storage System Status screen of GUI appears.

1-5 Click the [Initial Setup] menu on the [Easy Setup] tab.
The Start screen of the [Initial Setup] function appears.

1-6 Click the [Next >] button.

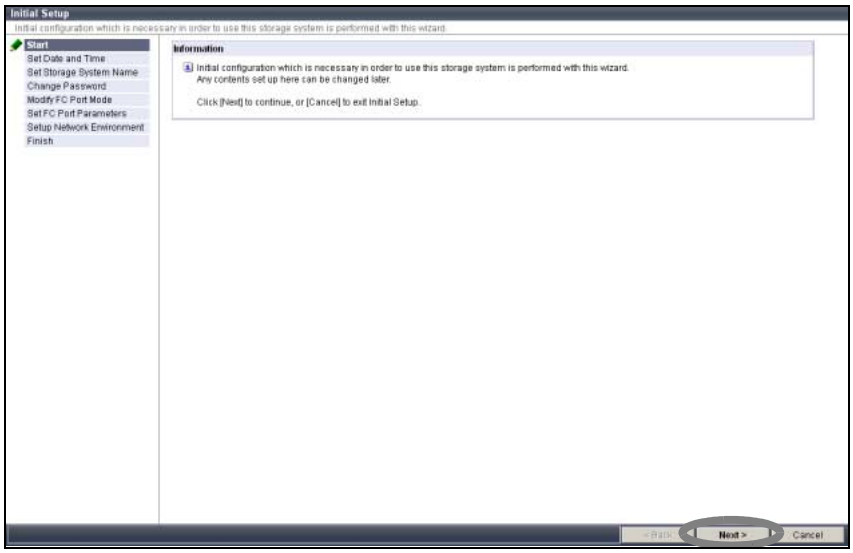
Initial Setup
Initial configuration which is necessary in order to use this storage system is performed with this wizard.
Start
Set Date and Time
Set Storage System Name
Change Password
Modify FC Port Mode
Set FC Port Parameters
Setup Network Environment
Finish
Information
Initial configuration which is necessary in order to use this storage system is performed with this wizard.
Any contents set up here can be changed later.
Click [Next] to continue, or [Cancel] to exit Initial Setup.
< Back
Next >
Cancel

Figure 7.2 Start screen of the [Initial Setup] function

The [Set Date and Time] screen appears.

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2 Set date and time.

Set the date and time of the internal clock of the ETERNUS DX60/DX80/DX90.

2-1 Set the necessary parameters, and click the [Next >] button.

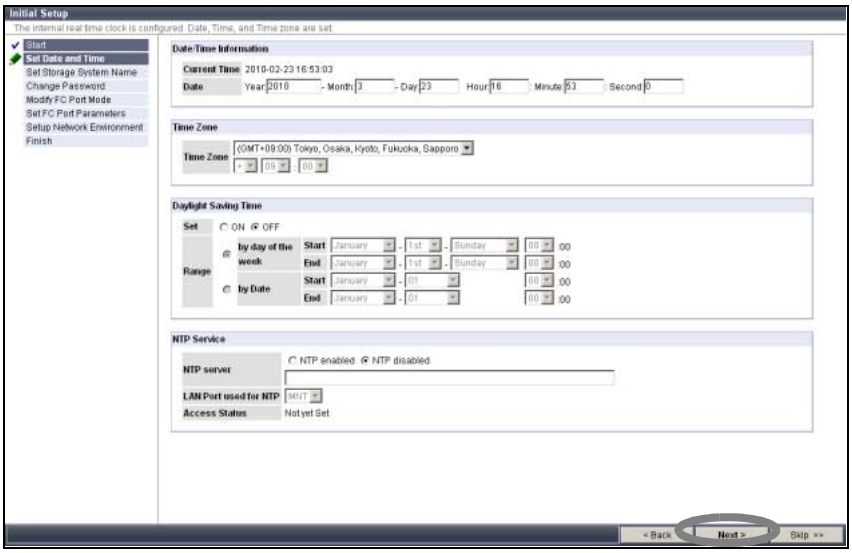
Initial Setup
The internal real time clock is configured. Date, Time, and Time zone are set.
Start
Set Date and Time
Set Storage System Name
Change Password
Modify FC Port Mode
Set FC Port Parameters
Setup Network Environment
Finish
Date/Time Information
Current Time 2010-02-23 16:53:03
Date Year 2010 - Month 3 - Day 23 Hour 16 Minute 53 Second 0
Time Zone
Time Zone (GMT+09:00) Tokyo, Osaka, Kyoto, Fukuoka, Sapporo
Daylight Saving Time
Set ON OFF
Range by day of the week Start January 1st Sunday 00:00
End January 1st Sunday 00:00
by Date Start January 01 00:00
End January 01 00:00
NTP Service
NTP server NTP enabled NTP disabled
LAN Port used for NTP MNT
Access Status Not yet Set
< Back
Next >
Skip >>

Figure 7.3 [Set Date and Time] screen

A confirmation screen appears.

2-2 Click the [OK] button.
The date and time setting is set, and the [Set Storage System Name] screen appears.

3 Set the machine name.

Set the name of ETERNUS DX60/DX80/DX90.

Note	The information that is set here is used for network management by SNMP. The device name is displayed in the logon screen and operation screen of GUI.

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3-1 Set the necessary parameters, and click the [Next >] button.

Figure 7.4 [Set Storage System Name] screen

A confirmation screen appears.

3-2 Click the [OK] button.
The machine name is set, and the [Change Password] screen appears.

4 Change the password.

Change the initial account password.

4-1 Set the necessary parameters in [Set Password], and click the [Next >] button.

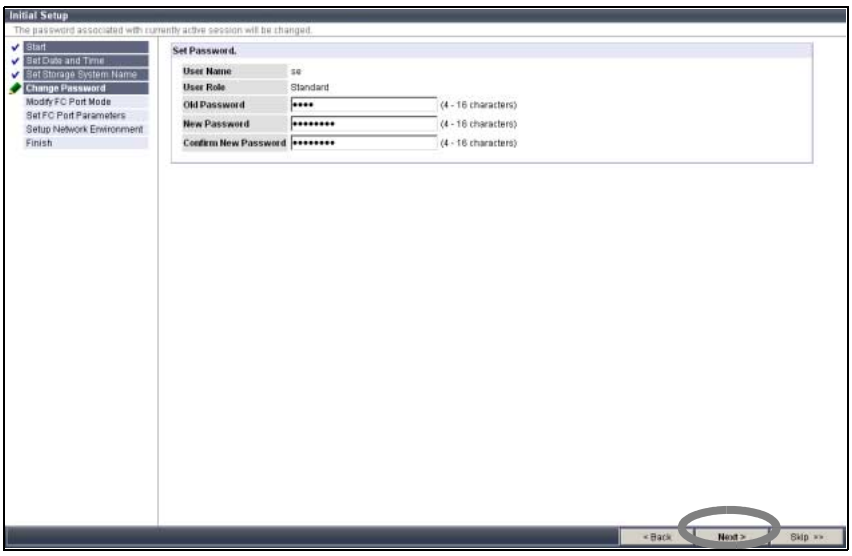

Figure 7.5 [Change Password] screen

A confirmation screen appears.

4-2 Click the [OK] button.
The password is changed. For the ETERNUS DX60/DX80, go to Step 6 "Set the port parameters". For the ETERNUS DX90, go to "Modify the FC Port Mode".

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5 Modify the FC Port Mode. (Only for ETERNUS DX90)

Change the port mode of the Fibre Channel port (Channel Adapter (CA) or Remote Adapter (RA)).

5-1 Set the "Port Mode(After)" to the appropriate port mode, and click the [Next >] button.

IMPORTANT

- Select "CA" when using the port to connect to the server. Select "RA" when using the port for REC.
- If the port mode is changed from "CA" to "RA", the LUN mapping information for the target CA port will be deleted.
- If the port mode is changed from "RA" to "CA", the Advanced Copy path information specified for the target FC port will be deleted.

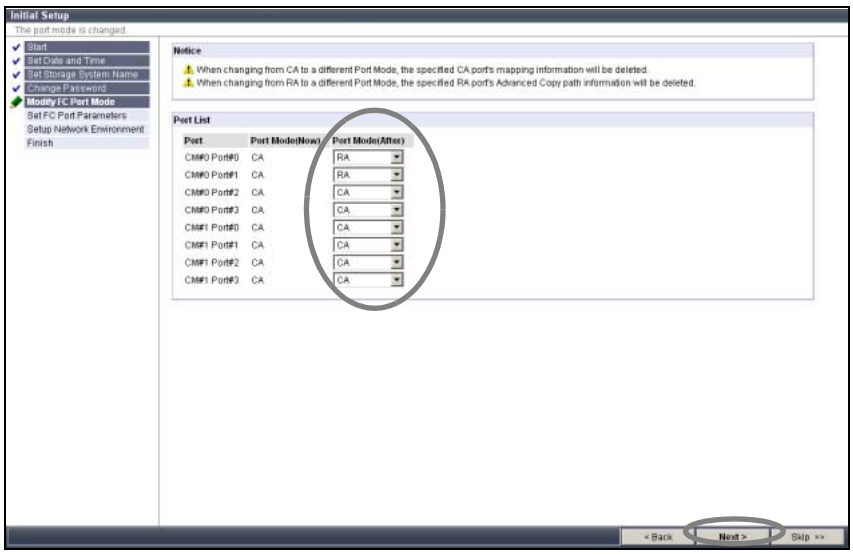
Initial Setup
The port mode is changed.
Start
Set Date and Time
Set Storage System Name
Change Password
Modify FC Port Mode
Set FC Port Parameters
Setup Network Environment
Finish
Notice
When changing from CA to a different Port Mode, the specified CA port's mapping information will be deleted.
When changing from RA to a different Port Mode, the specified RA port's Advanced Copy path information will be deleted.
Port List
Port
Port Mode(Now)
Port Mode(After)
CM#0 Port#0 CA RA
CM#0 Port#1 CA RA
CM#0 Port#2 CA CA
CM#0 Port#3 CA CA
CM#1 Port#0 CA CA
CM#1 Port#1 CA CA
CM#1 Port#2 CA CA
CM#1 Port#3 CA CA
< Back
Next >
Skip >>

Figure 7.6 [Modify FC Port Mode] screen

A confirmation screen appears.

5-2 Click the [OK] button.
The port mode is set, and the [Port Parameter Settings] screen appears.

6 Set Port Parameters.

Set the connecting information for the port.
Setting screens will vary depending on the ETERNUS DX60/DX80/DX90 model.

IMPORTANT

When using the Host Affinity functions, make sure to "Enable" the Host Affinity setting of the port.
Refer to "1.3.7 Security Functions" (page 46) for details about the Host Affinity functions.

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■ For Fibre Channel

On the [Set FC Port Parameters] screen, set the information (detailed Fibre Channel port information) for the connection between the FC ports of the ETERNUS DX60/DX80/DX90 and server, or between the FC ports of the local and remote devices.

(1) Select a port and specify the necessary items in "Port Settings", and click the [Next >] button.

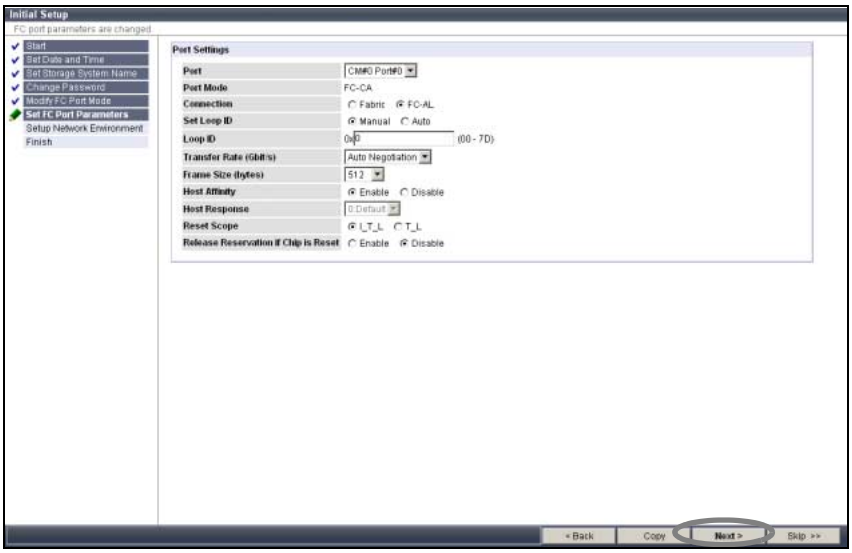

Figure 7.7 [Set FC Port Parameters] screen (for the "FC-CA" Port Mode)

A confirmation screen appears.

(2) Click the [OK] button.
The port parameters are set, and the [Setup Network Environment] screen appears.

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■ For iSCSI

On the [Set iSCSI Port Parameters] screen, set the information for the connection (detailed iSCSI port information) between the ETERNUS DX60/DX80 iSCSI port and the server.

(1) Select a port and specify the necessary items in "Select Port", and click the [Next >] button.

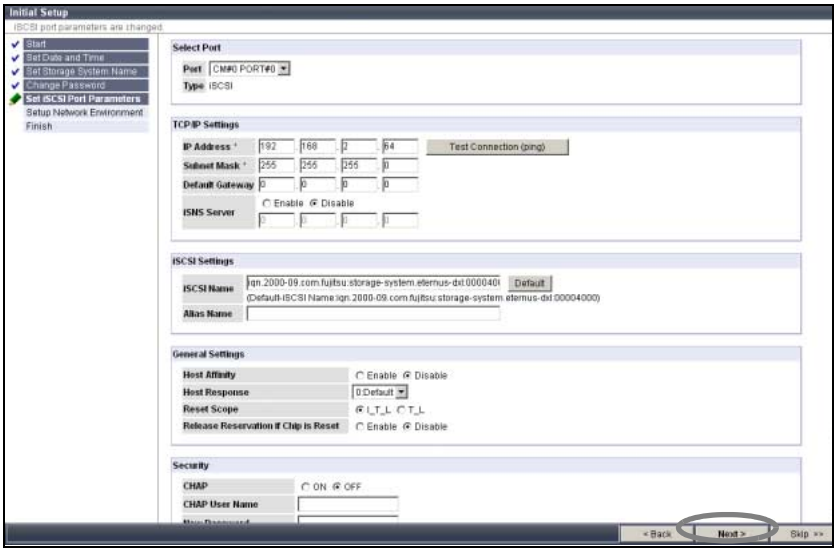

Figure 7.8 [Set iSCSI Port Parameters] screen

A confirmation screen appears.

(2) Click the [OK] button.
The port parameters are set, and the [Setup Network Environment] screen appears.

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■ For SAS

On the [Set SAS Port Parameters] screen, set the information for the connection (detailed SAS port information) between the ETERNUS DX60/DX80 SAS port and the server.

(1) Select a port and specify the necessary items in "Port Settings", and click the [Next >] button.

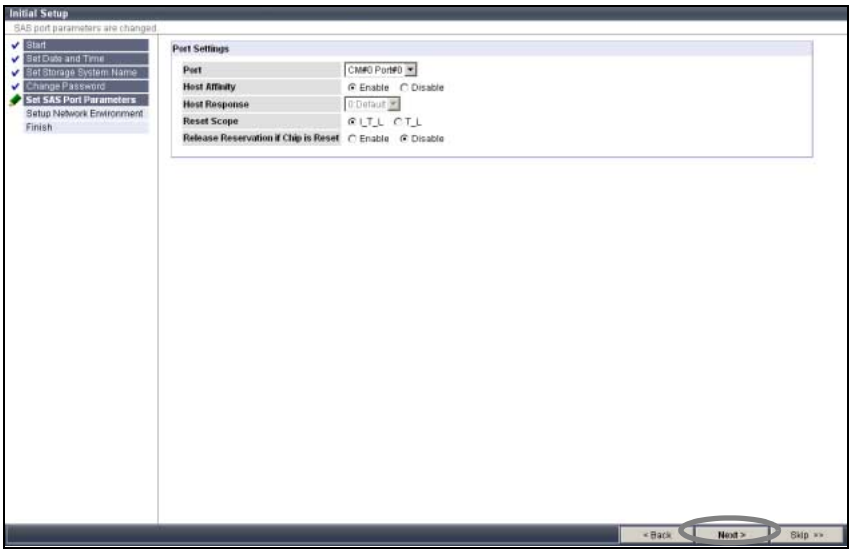

Figure 7.9 [Set SAS Port Parameters] screen

A confirmation screen appears.

(2) Click the [OK] button.
The port parameters are set, and the [Setup Network Environment] screen appears.

7 Set the network environment.

Set the ETERNUS DX60/DX80/DX90 environment for network communication.

7-1 Set the necessary parameters such as a MNT port IP address, subnet mask and default gateway, and click the [Next >] button.

IMPORTANT	Never set all of the "Interface" fields ("http", "https", "telnet", "SSH", "Maintenance", "Maintenance-Secure", and "ICMP") to "Disable". If this is done, network access to the device becomes impossible. If the device becomes inaccessible in this way, pressing the Controller Enclosure's IP RESET Switch twice in succession within a two second interval will reset it to its factory default settings, and reallow network access.

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Note

- Disabling unused protocols is a standard security measure. If the following "Interface" fields are set to "Disable", network access to the ETERNUS DX60/DX80/DX90 via the services that use these protocols is blocked.
  - "http", "https"
    To block GUI access.
  - "telnet", "SSH"
    To block CLI access.
  - "Maintenance", "Maintenance-Secure"
    To block monitoring software access.
  - "ICMP"
    To block "ping" requests.
- The appropriate IP address or network address must be set in the "Allowed IP List" to allow access from a device in a network other that in which the ETERNUS DX60/DX80/DX90 resides. Devices in the same network as the ETERNUS DX60/DX80/DX90 are allowed access even if not set in the "Allowed IP List".

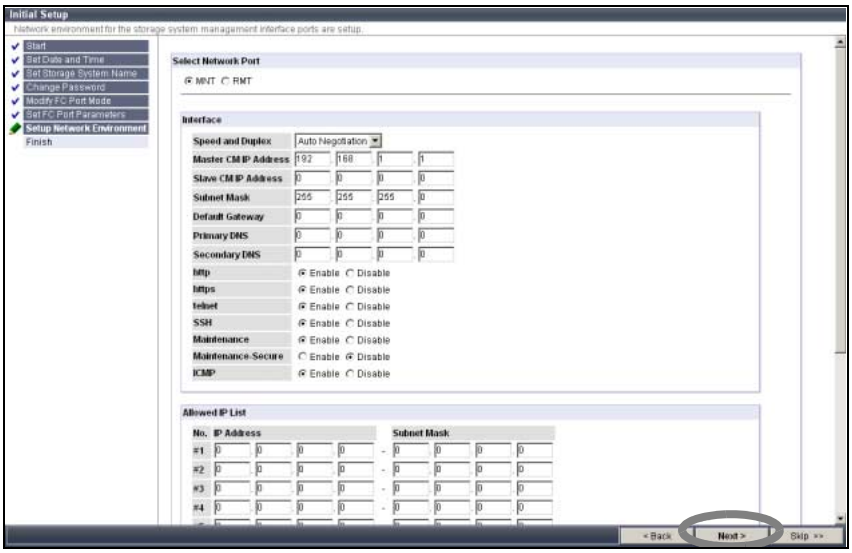

Figure 7.10 [Setup Network Environment] screen

A confirmation screen appears.

7-2 Click the [OK] button.
The Network Environment is set, and the [Finish] screen appears.

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8 Finish the initial setup.

8-1 Click the [Finish] button.

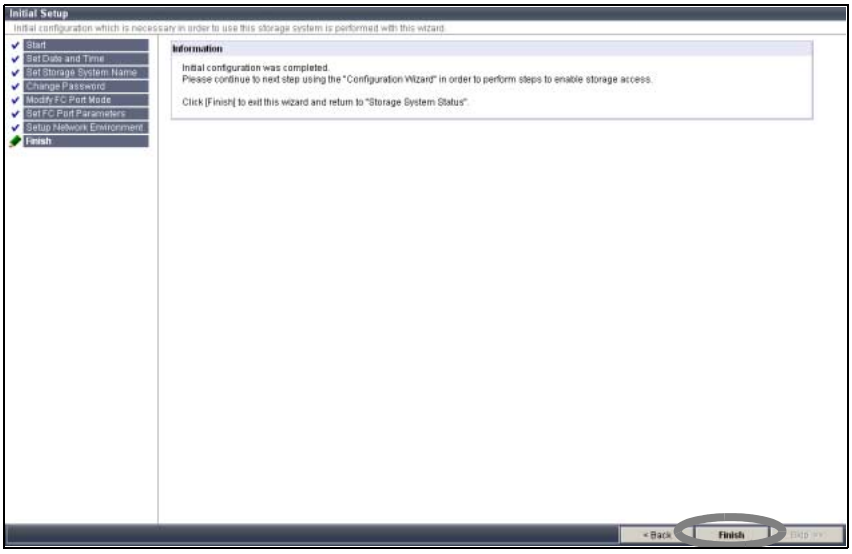
Initial Setup
Initial configuration which is necessary in order to use this storage system is performed with this wizard.
Start
Set Date and Time
Set Storage System Name
Change Password
Modify FC Port Mode
Set FC Port Parameters
Setup Network Environment
Finish
Information
Initial configuration was completed.
Please continue to next step using the "Configuration Wizard" in order to perform steps to enable storage access.
Click [Finish] to exit this wizard and return to "Storage System Status".
< Back
Finish

Figure 7.11 [Finish] screen of the initial setup

The [Initial Setup] completes.

IMPORTANT	Device setting operation cannot be continued if the IP address is changed. Logon again with the new IP address is required.

8-2 Remove the LAN cable (for operation management) from the PC, and connect the LAN cable (for operation management) of the MNT port of Controller 1 (CM#1) and Controller 0 (CM#0) to the customer's network.

8-3 Start the Web browser, and logon again with the new IP address to perform the configuration settings of the ETERNUS DX60/DX80/DX90 using Configuration Wizard.

End of procedure

7.2.2 Configuration Wizard

Perform the settings necessary for device operation using the [Configuration Wizard] menu on the [Easy Setup] tab.
Perform the settings in the following order.

- Create RAID Group
- Create Volume
- Define Host
- Configure Affinity Group
- Define LUN Mapping

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For setting-related details, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide". Also refer to the "ETERNUS DX Disk storage systems Server Connection Guide" as required.

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS DX Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS DX Disk storage systems Server Connection Guide (SAS)"

Procedure

1 Start Configuration Wizard.

1-1 Click the [Configuration Wizard] button on the [Easy Setup] tab in GUI.
The [Configuration Wizard] screen appears.

1-2 Click the [Start] button.

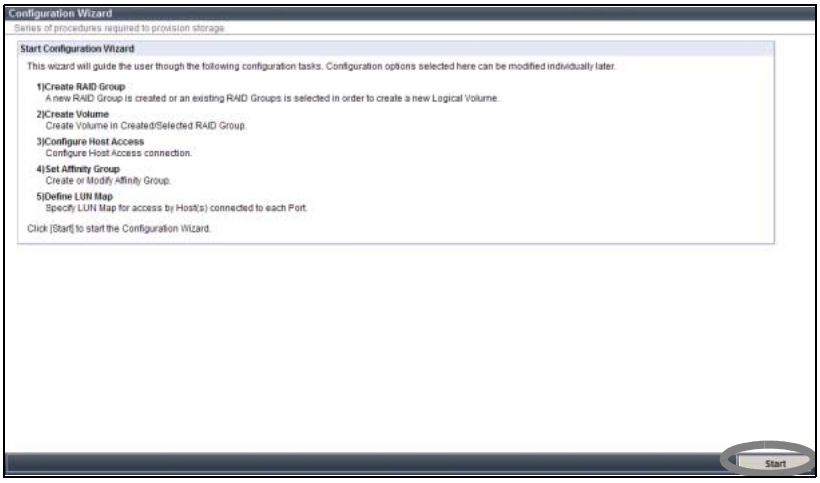
Configuration Wizard
Series of procedures required to provision storage.
Start Configuration Wizard
This wizard will guide the user though the following configuration tasks. Configuration options selected here can be modified individually later.
1)Create RAID Group
A new RAID Group is created or an existing RAID Groups is selected in order to create a new Logical Volume.
2)Create Volume
Create Volume in Created/Selected RAID Group.
3)Configure Host Access
Configure Host Access connection.
4)Set Affinity Group
Create or Modify Affinity Group.
5)Define LUN Map
Specify LUN Map for access by Host(s) connected to each Port.
Click [Start] to start the Configuration Wizard.
Start

Figure 7.12 Configuration Wizard initial screen

The Configuration Wizard starts. The [Create RAID Group] menu screen appears.

2 Create a RAID Group.

Create or select a RAID group in which a volume is created (a group of disks configuring RAID in the storage system device).

IMPORTANT

- If the factory default settings are to be used, this setting is not required. When settings are desired, delete the factory settings (logical volumes, RAID groups, and LUN mappings) and then create your own RAID groups. For setting deletion details, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide".
- For RAID5, RAID5+0, and RAID6, ensure that a single RAID group is not being configured by too many disks. Doing so may increase the time to perform data restoration from parities and Rebuild/Copyback when a disk fails.
- Disks with different types can be installed in a single Drive Enclosure. However, all disks configuring a RAID group should be of the same type. Do not include disks with a different type in a RAID group.

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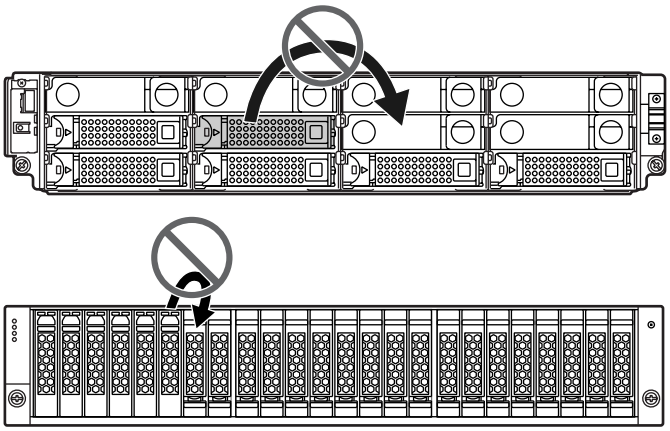
CAUTION

Do

- Data may not be recovered if a disk fails because RAID0 configuration is not redundant. RAID1, RAID1+0, RAID5, RAID5+0 , and RAID6 are recommended as the RAID level.

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



2-1 Select the RAID group creating method on the [Create RAID Group] screen, and click the [Next >] button.
When "Select existing RAID Group" is selected, move on to Step 3.

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2-2 Set the necessary items, and click the [Create] button.
The following is a setting example when "Create RAID Group (Disks are assigned automatically)" is selected.

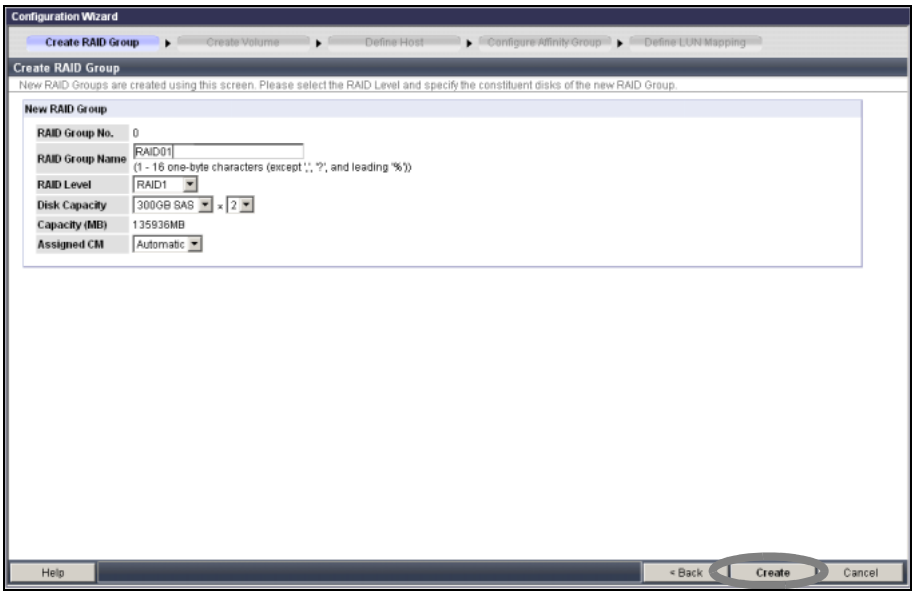

Figure 7.13 [Create RAID Group] screen

A confirmation screen appears.

2-3 Click the [OK] button.
The RAID group is created, and the [Create Volume] screen appears.

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3 Create a volume.

Create a volume (area in the disks in the RAID group) in a RAID group.

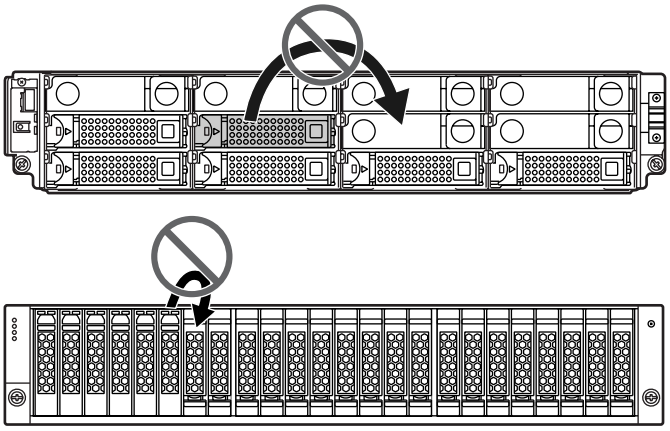
IMPORTANT

If the factory default settings are to be used, this setting is not required. When settings are desired, delete the factory settings (logical volumes and LUN mappings) and then create your own logical volumes. For setting deletion details, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



3-1 Specify the necessary items in "New Volume", and click the [Create] button.

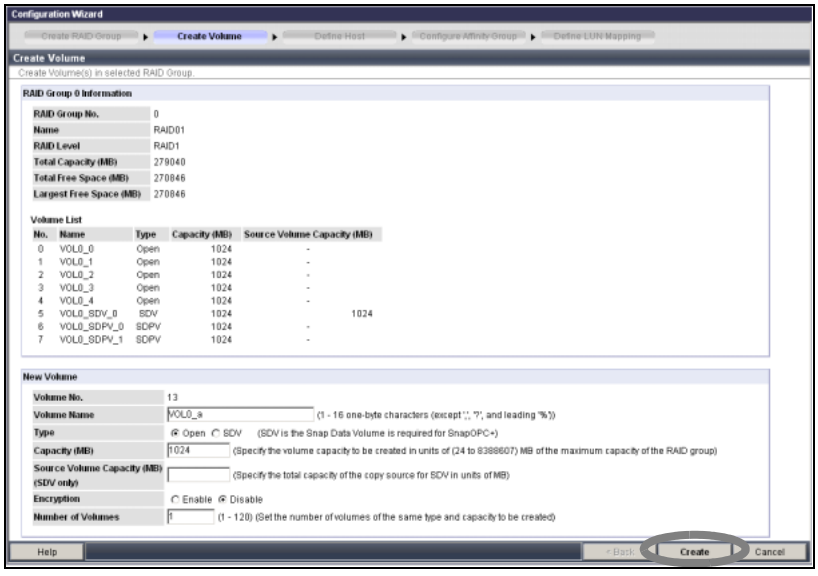

Configuration Wizard
Create RAID Group
Create Volume
Define Host
Configure Affinity Group
Define LUN Mapping
Create Volume
Create Volume(s) in selected RAID Group.
RAID Group 0 Information
RAID Group No. 0
Name RAID01
RAID Level RAID1
Total Capacity (MB) 279040
Total Free Space (MB) 270846
Largest Free Space (MB) 270846
Volume List
No. Name Type Capacity (MB) Source Volume Capacity (MB)
0 VOL0_0 Open 1024 -
1 VOL0_1 Open 1024 -
2 VOL0_2 Open 1024 -
3 VOL0_3 Open 1024 -
4 VOL0_4 Open 1024 -
5 VOL0_SDV_0 SDV 1024 1024
6 VOL0_SDPV_0 SDPV 1024 -
7 VOL0_SDPV_1 SDPV 1024 -
New Volume
Volume No. 13
Volume Name VOL0_8 (1 - 16 one-byte characters (except ',', '?', and leading '%'))
Type Open SDV (SDV is the Snap Data Volume is required for SnapOPC+)
Capacity (MB) 1024 (Specify the volume capacity to be created in units of (24 to 8388607) MB of the maximum capacity of the RAID group)
Source Volume Capacity (MB) (SDV only) (Specify the total capacity of the copy source for SDV in units of MB)
Encryption Enable Disable
Number of Volumes 1 (1 - 120) (Set the number of volumes of the same type and capacity to be created)
Help
< Back
Create
Cancel

Figure 7.14 [Create Volume] screen

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A confirmation screen appears.

3-2 Click the [OK] button.
The volume is created, and the [Define Host] screen appears.

4 Set up the host.

Specify information for the server being connected to the ETERNUS DX60/DX80/DX90.
Setting screens will vary depending on the ETERNUS DX60/DX80/DX90 model.

IMPORTANT	When the Host Affinity function is not used, the host setting is not required.

■ For Fibre Channel

On the [Setup FC Host] screen, register the Fibre Channel card WWN for the server being connected to the ETERNUS DX60/DX80/DX90.

IMPORTANT	When a FC switch is connected to the ETERNUS DX60/DX80/DX90, settings for FC switch and the server (FC host) must be completed in advance.

(1) Click the [Add] button on the [Setup FC Host] screen.

(2) Specify a WWN, server name, and host response.

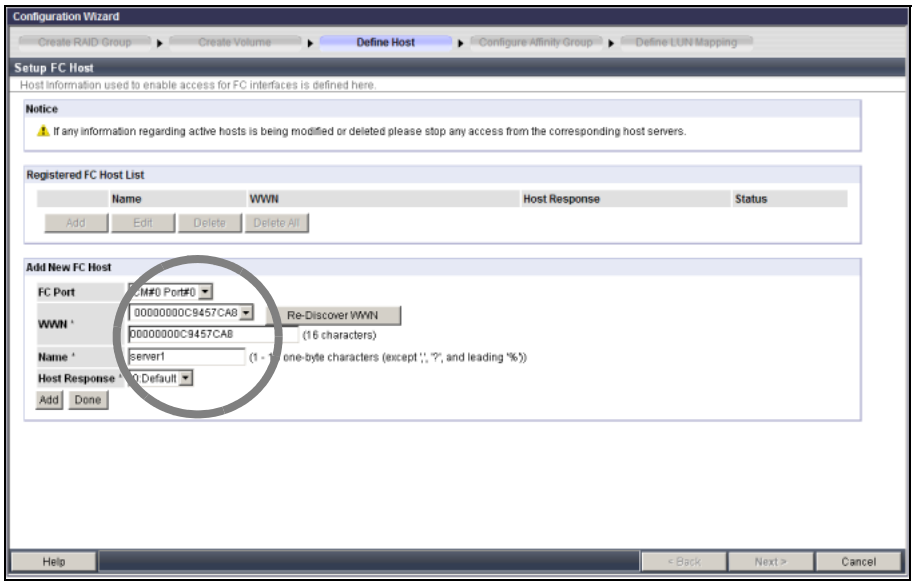

Figure 7.15 [Setup FC Host] screen

(3) Specify the other necessary items, and click the [Add] button.
The target FC host is displayed in the "Registered FC Host List" field.

(4) When adding another FC host, repeat Step (2) and Step (3).
If another FC host does not need to be added, click the [Done] button.

(5) Click the [Next >] button.
A confirmation screen appears.

(6) Click the [OK] button.
The settings are reflected and the [Configure Affinity Group] screen in Step 5 appears.

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■ For iSCSI

On the [Setup iSCSI Host] screen, set the iSCSI name, IP address, and other items for the server being connected to the ETERNUS DX60/DX80.

(1) Click the [Add] button on the [Setup iSCSI Host] screen

(2) Specify an iSCSI name, IP address, server name, host response, and CHAP password.

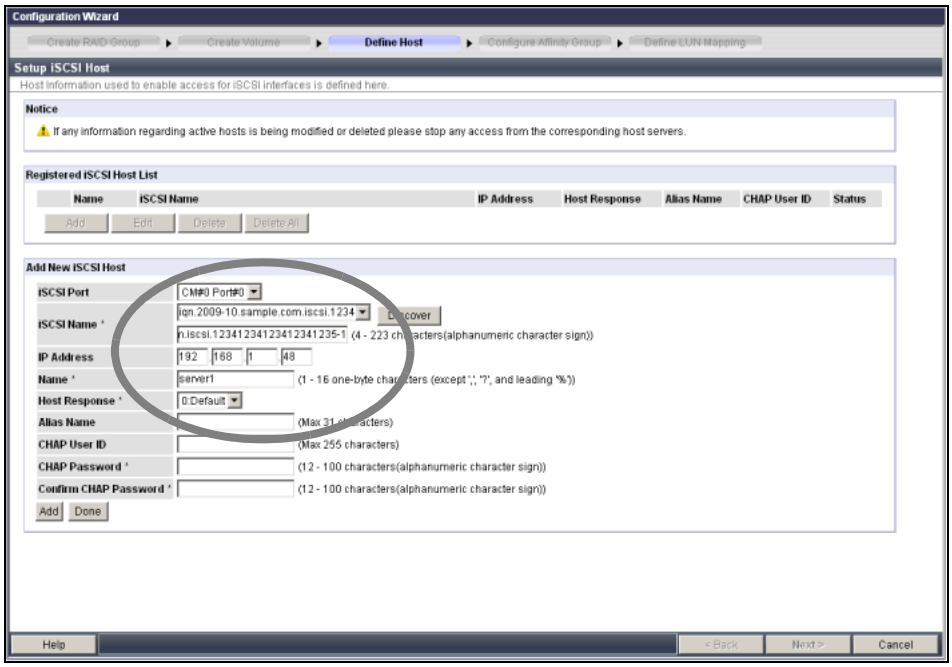

Figure 7.16 [Setup iSCSI Host] screen

(3) Specify the other necessary items, and click the [Add] button.
The target iSCSI host is displayed in the "Registered iSCSI Host List" field.

(4) When adding another iSCSI host, repeat Step (2) and Step (3).
If another iSCSI host does not need to be added, click the [Done] button.

(5) Click the [Next >] button.
A confirmation screen appears.

(6) Click the [OK] button.
The settings are reflected and the [Configure Affinity Group] screen in Step 5 appears.

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■ For SAS

On the [Setup SAS Host] screen, set the SAS address, and other items for the server being connected to the ETERNUS DX60/DX80.

(1) Click the [Add] button on the [Setup SAS Host] screen

(2) Specify a SAS address, server name, and host response.

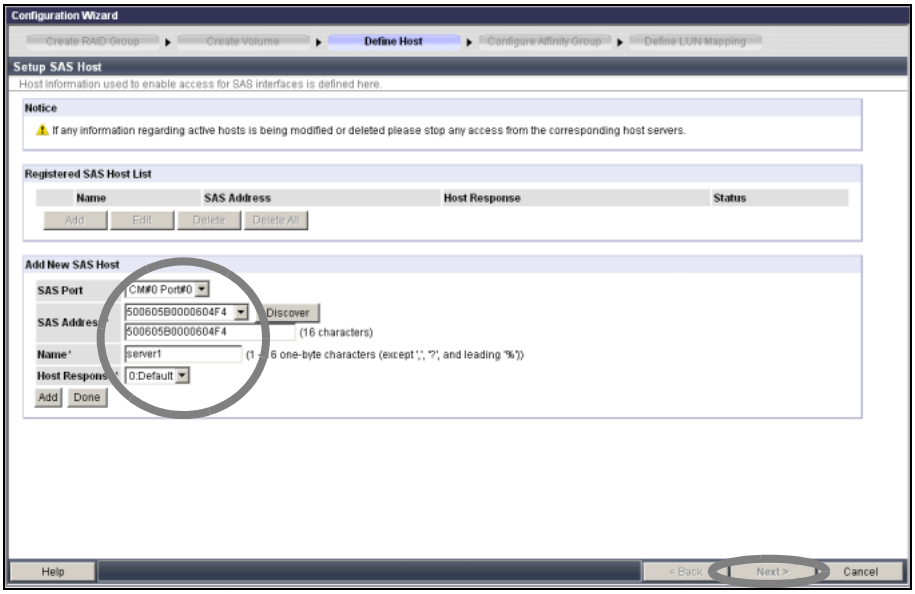

Figure 7.17 [Setup SAS Host] screen

(3) Specify the other necessary items, and click the [Add] button.
The target SAS host is displayed in the "Registered SAS Host List" field.

(4) When adding another SAS host, repeat Step (2) and Step (3).
If another SAS host does not need to be added, click the [Done] button.

(5) Click the [Next >] button.
A confirmation screen appears.

(6) Click the [OK] button.
The settings are reflected and the [Configure Affinity Group] screen in Step 5 appears.

5 Set up an affinity group.

Create the group of volumes that are to be recognized by the server (affinity group).

IMPORTANT	Create an affinity group when using the Host Affinity function. When not using the Host Affinity function, click the [Next] button and proceed to [Define LUN Mapping].

5-1 Click the [Create] button.

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5-2 Enter the affinity group name in [Affinity Group Setting] and specify a volume number or volume name corresponding to the Logical Unit Number (LUN) in [Define LUN Mapping], and click the [Set] button.

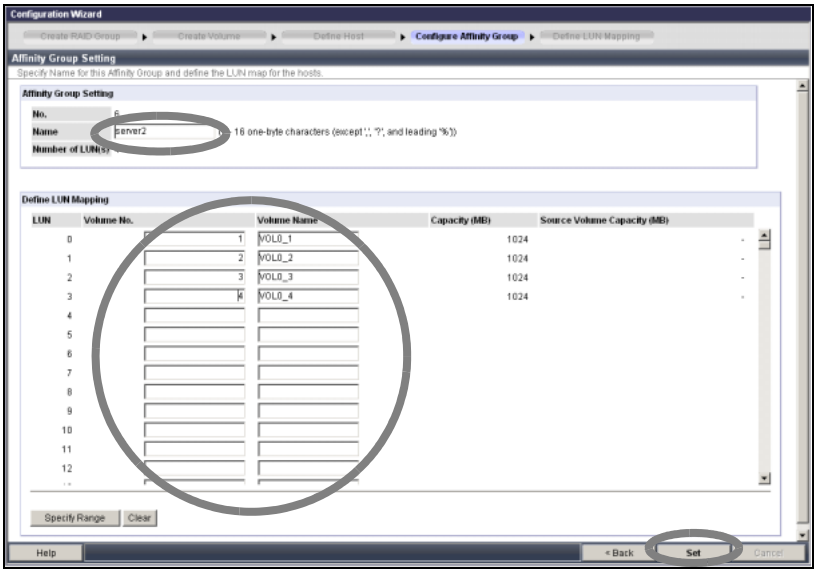

Figure 7.18 [Configure Affinity Group] screen

A confirmation screen appears.

5-3 Click the [OK] button.
The affinity group is created, and the affinity group list is displayed.

5-4 Click the [Next >] button.
The [Define LUN Mapping] screen appears.

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6 Configure a LUN mapping.

Set a volume to be recognized by the server.

■ When the Host Affinity function is used

Assign an affinity group to each server that is to be connected to the port.

(1) Select the port to be set from the "Port List" field, and click the [Edit] button.

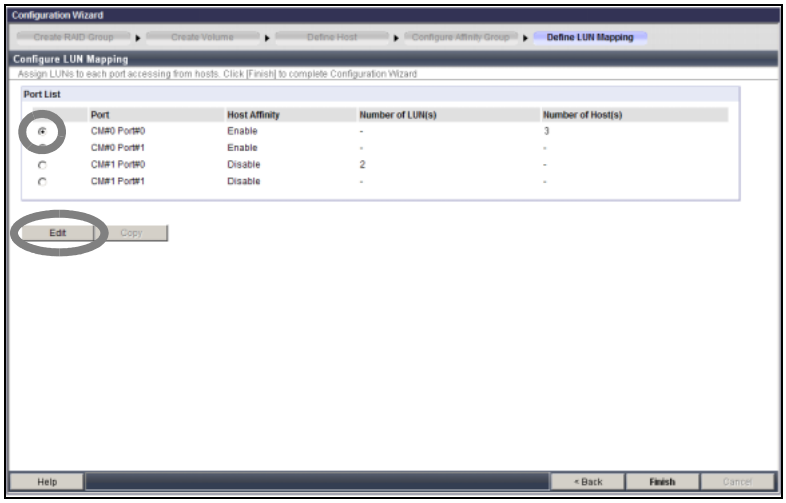

Figure 7.19 [Define LUN Mapping] screen 1 (when the Host Affinity function is used)

(2) Assign the affinity group to the server, and click the [Set] button.

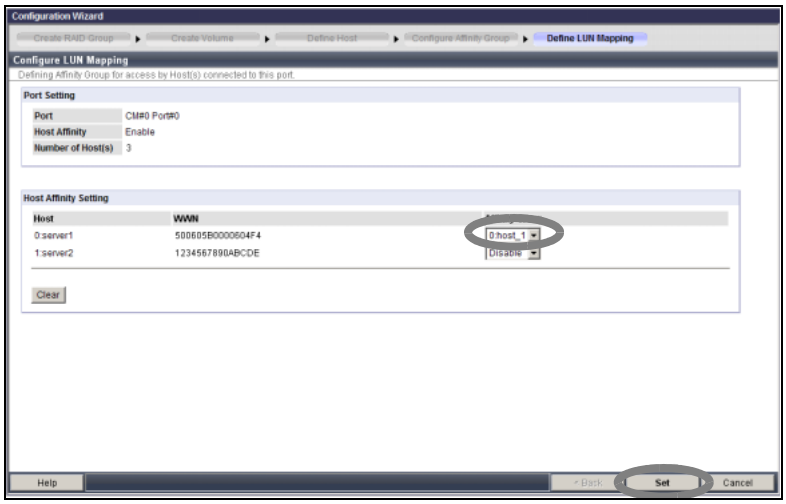

Figure 7.20 [Define LUN Mapping] screen 2 (when the Host Affinity function is used)

A confirmation screen appears.

(3) Click the [OK] button.
The affinity group is created, and the screen returns to the screen displayed in Step (1). Set other affinity groups as required.

(4) Click the [Exit] button.
The settings are reflected, and a message to confirm finishing the Configuration Wizard appears.

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■ When the Host Affinity function is not used

Correspond the volume number to the LUN that can be recognized by the server for ports.

(1) Select the port and click the [Edit] button to change the setting.

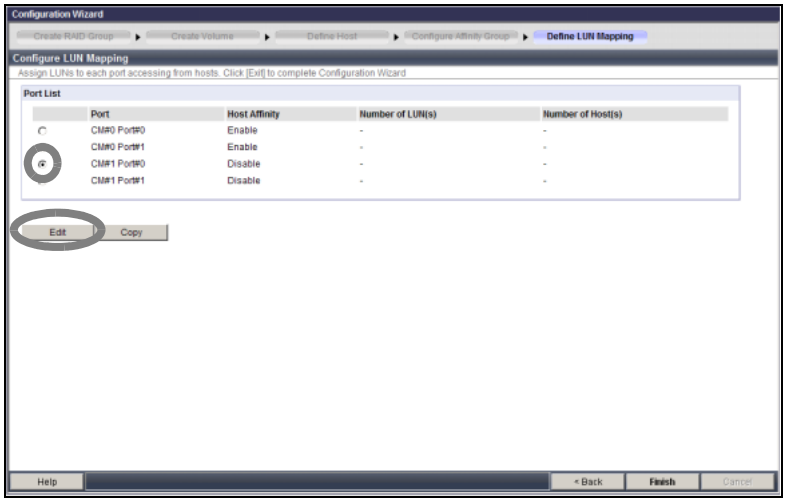

Figure 7.21 [Define LUN Mapping] screen 1 (when the Host Affinity function is not used)

(2) Change the setting as required, and click the [Set] button.

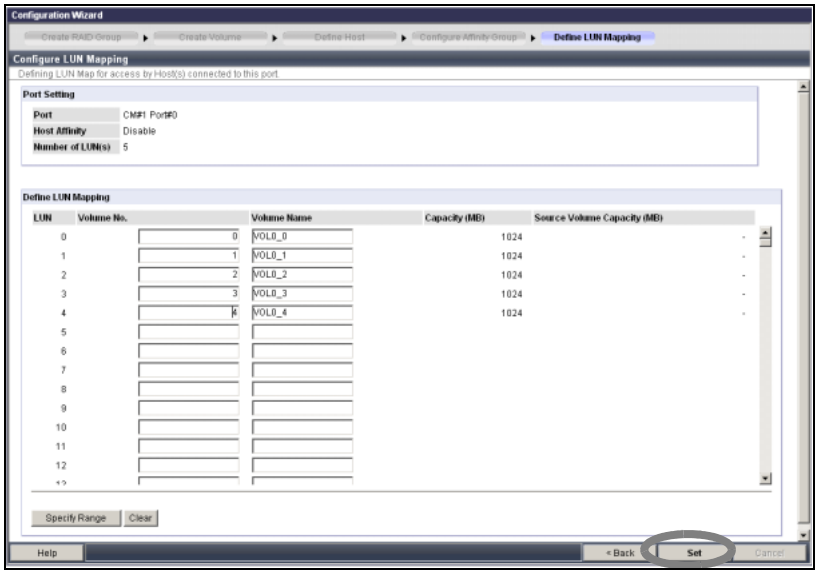

Figure 7.22 [Define LUN Mapping] screen 2 (when the Host Affinity function is not used)

A confirmation screen appears.

(3) Click the [OK] button.
Returns to the screen of "Port List" in Step (1).

(4) Click the [Exit] button.
A message to confirm finishing the Configuration Wizard appears.

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7 Finish Configuration Wizard.

7-1 Click the [OK] button.
Configuration Wizard finishes.

End of procedure

7.2.3 Hot Spare Registration

Register the hot spare for the failure of a disk.

IMPORTANT
- Check the factory settings and register a hot spare as required.
- System disks cannot be registered as hot spares.

Note

The following two types of Hot spare are available:
- Global Hot spare
  This is available for any RAID group.
- Dedicated Hot spare
  This is only available to one specified RAID group.

For a RAID group that contains important data, assign one or more "Dedicated Hot spares", in order to preferentially improve that RAID group's access to hot spares.

CAUTION

Do

- Be sure to register hot spares.
- A smaller capacity disk is not usable as a hot spare for a larger capacity data disk.
- When registering Global Hot spares, the capacity of at least one hot spare should be the same as that of the largest capacity disk in the storage system.
  If a mixture of SAS disks, Nearline SAS disks, and SSDs are installed in the storage system, separate hot spares will be required for each type of disk. The capacity of each type of hot spare should be the same as that of the largest capacity same-type disk.
- When registering Dedicated Hot spares, the capacity of each hot spare should be the same as that of the capacity of the disks in the RAID group.

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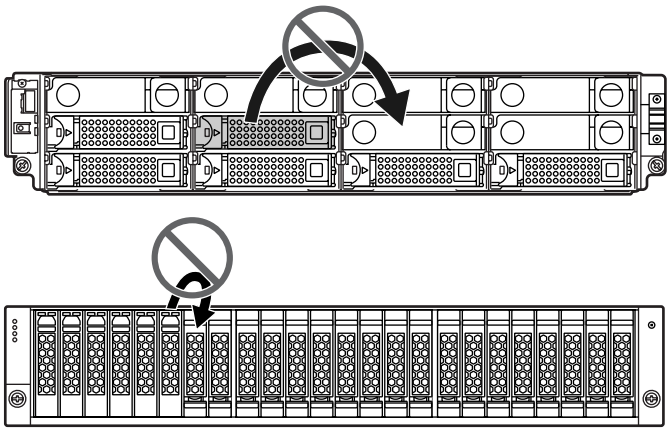
CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



Note

This section explains the procedure for the setup using GUI. For the setup using the CLI commands, refer to "ETERNUS DX60/DX80/DX90 CLI User Guide".

For setting-related details, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

Refer

"ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX60/DX80/DX90 CLI User Guide"

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Procedure

1 In the GUI screen, click [Assign Hot Spare] under the [RAID Group Management] menu on the [Volume Settings] tab.
The [Assign Hot Spare] screen appears.

2 Select the hot spare type and the disk to be used as hot spare, and click the [Assign] button.
The following is a setting example when "Global Hot Spare" is selected.
When selecting "Dedicated Hot Spare" as the hot spare type, "Select an existing RAID Group" appears.

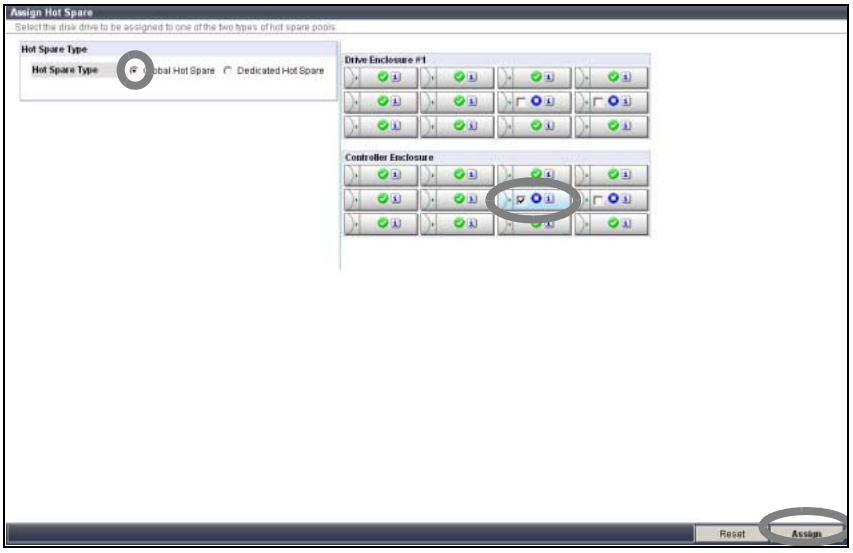

Figure 7.23 [Assign Hot Spare] screen

A confirmation screen appears.

3 Click the [OK] button.
The hot spare is registered.

End of procedure

Note

This ends the basic settings.
If further setup is necessary, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

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7.3 Advanced Copy Setup

This section explains how to activate the Advanced Copy functions for use in a GUI, CLI, or VSS environment by registering a purchased ETERNUS SF Snap/Clone License, ETERNUS SF AdvancedCopy Manager Local Copy License, or Advanced Copy Feature (ETLL6CPU, ETLL8CPU) license.
For details on usage and overview of the Advanced Copy function, refer to "1.3.3 Advanced Copy" (page 39).

Note

When using ETERNUS SF AdvancedCopy Manager or ETERNUS SF Express, perform the Advanced Copy settings described in the respective documents.

- ETERNUS SF Snap/Clone License,
  ETERNUS SF AdvancedCopy Manager Local Copy License

  Obtain a license key as described in the document provided with the license.
  Using the obtained license key, register the license according to the procedure given in "7.3.2 Registering the Advanced Copy License Key" (page 168) to activate the Advanced Copy functions.

- Advanced Copy Feature (ETLL6CPU, ETLL8CPU)

  Obtain and register this license according to the procedure given in "7.3.1 Obtaining the Advanced Copy License Key" (page 163) and "7.3.2 Registering the Advanced Copy License Key" (page 168).

7.3.1 Obtaining the Advanced Copy License Key

After the Advanced Copy Feature is purchased, it is activated by registering an Advanced Copy license key in the ETERNUS DX60/DX80.

To obtain this license key, refer to "ETERNUS DX60/DX80/DX90 Disk storage system Feature activation licenses" document provided with the Advanced Copy Feature for the appropriate web-site URL.

Refer

"ETERNUS DX60/DX80/DX90 Disk storage system Feature activation licenses"

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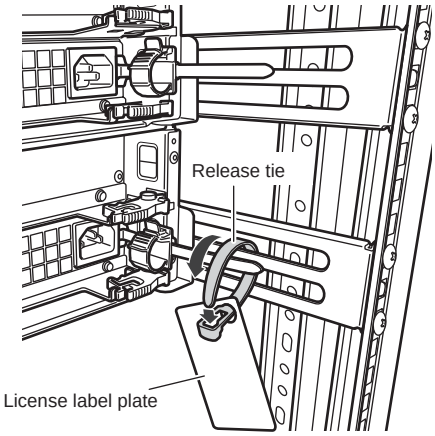
Note

- When the Advanced Copy Feature is purchased at the same time as the ETERNUS DX60/DX80 (base unit), this procedure is not necessary because the license is registered as a factory setting.
  Attach the license label plate provided with the Advanced Copy Feature to the rack rail near the ETERNUS DX60/DX80 which holds its license, for future reference.



- Check whether the license has already been registered using the provided license label plate or the GUI screen.
  - The license key (bar code and 16-digit numeric number) is printed in the "License Key" column in the provided license label plate.
  - The "Advanced Copy License" field in the Advanced Copy Status screen of GUI is set to "Registered".

Obtain the license key according the following procedure.

Procedure

1 Obtain the Advanced Copy license key.

1-1 Prepare and check the following in advance.

- "ETERNUS DX60/DX80/DX90 Disk storage system Feature activation licenses"
  This is provided with the Advanced Copy Feature.
- License label plate
  This is provided with the Advanced Copy Feature. The license label is attached to the license label plate, and TAN etc. are indicated.
- Serial Number of the ETERNUS DX60/DX80
  The serial number can be checked via the GUI screen.

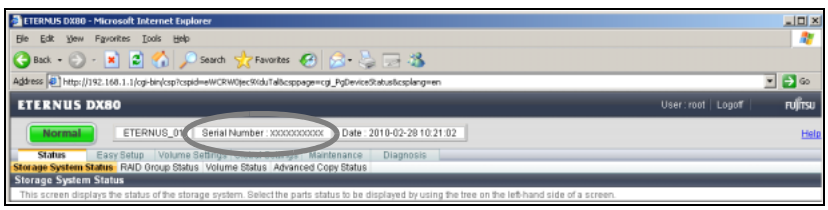


Figure 7.24 Display location of the serial number (GUI screen)

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1-2 Access the license issuance URL, and click the "ETERNUS DX60/DX80/DX90 Advanced Copy License" link under the [Select a product to register].
For the URL of the web-site, refer to "ETERNUS DX60/DX80/DX90 Disk storage system Feature activation licenses".

IMPORTANT	The actual contents of the license key issuance screen that is described here may differ according to the time that the Advanced Copy Feature is purchased. The latest version of this manual is open to the public on the following web-site. Refer to this manual if required. http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx-entry/

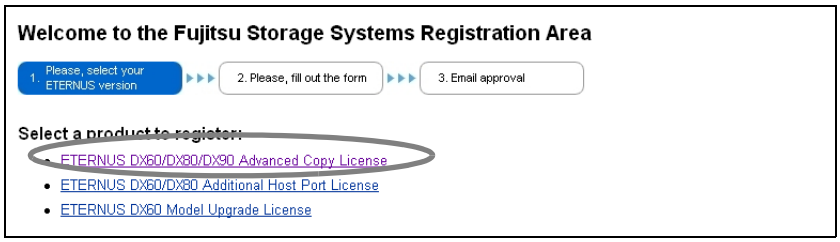
Welcome to the Fujitsu Storage Systems Registration Area
1. Please, select your ETERNUS version
2. Please, fill out the form
3. Email approval
Select a product to register:
ETERNUS DX60/DX80/DX90 Advanced Copy License
ETERNUS DX60/DX80 Additional Host Port License
ETERNUS DX60 Model Upgrade License

Figure 7.25 Advanced Copy Feature License Key Web Screen 1

1-3 Enter the necessary items on the following screen.

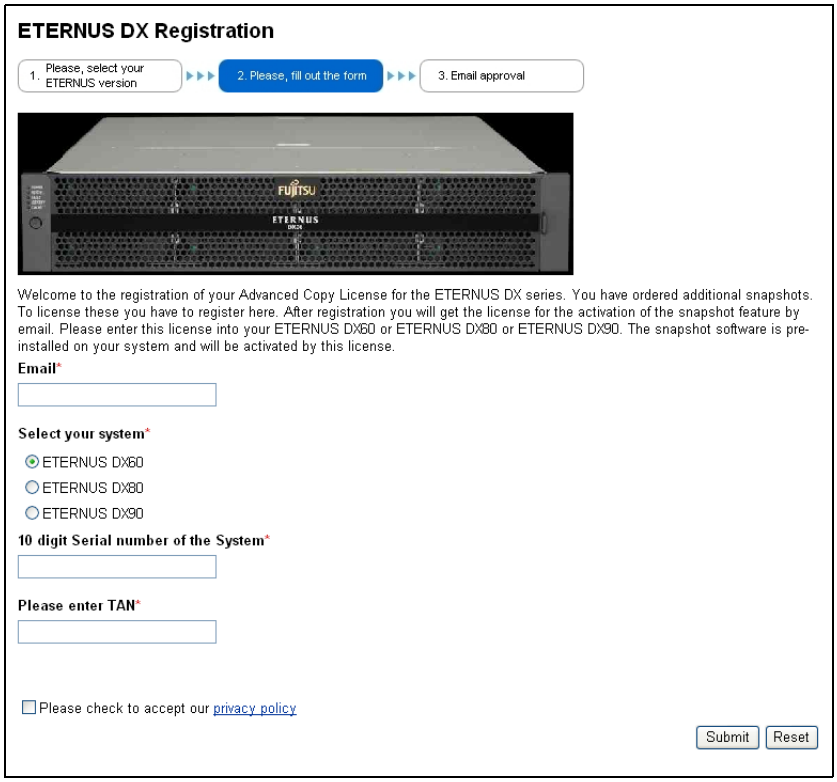
ETERNUS DX Registration
1. Please, select your ETERNUS version
2. Please, fill out the form
3. Email approval
Welcome to the registration of your Advanced Copy License for the ETERNUS DX series. You have ordered additional snapshots. To license these you have to register here. After registration you will get the license for the activation of the snapshot feature by email. Please enter this license into your ETERNUS DX60 or ETERNUS DX80 or ETERNUS DX90. The snapshot software is pre-installed on your system and will be activated by this license.
Email*
Select your system*
ETERNUS DX60
ETERNUS DX80
ETERNUS DX90
10 digit Serial number of the System*
Please enter TAN*
Please check to accept our privacy policy
Submit
Reset

Figure 7.26 Advanced Copy Feature License Key Web Screen 2

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Enter and select the following items.

- Email
  Enter the destination E-mail address to which the license key notification E-mail is to be sent.

  CAUTION

  Do

  - Make sure not to enter a wrong E-mail address.

- Select your system
  Select ETERNUS DX60 or ETERNUS DX80.
- 10 digit Serial number of the System
  Enter the serial number of the ETERNUS DX60/DX80.
  To prevent incorrect input of the serial number, copy and paste the "Serial Number" that is displayed in the GUI screen.

  1 Select the character string of "Serial Number" displayed in the GUI screen, and press the [Ctrl] + [c] key, or right-click and select [Copy].

  2 Move the cursor to the serial number input field of the license issuance screen, and press the [Ctrl] + [v] key, or right-click and select [Paste].

  CAUTION

  Do

  - Make sure not to enter a wrong serial number.
    If an incorrect serial number is entered, an invalid license key is issued, and it cannot be registered in the ETERNUS DX60/DX80.

- Please enter TAN
  Enter an 8-digit numeric number that is indicated in [TAN] on the license label plate.

1-4 Click [Submit].
The license key is issued, and displayed on the screen. The license key notification E-mail is sent to the specified E-mail address.

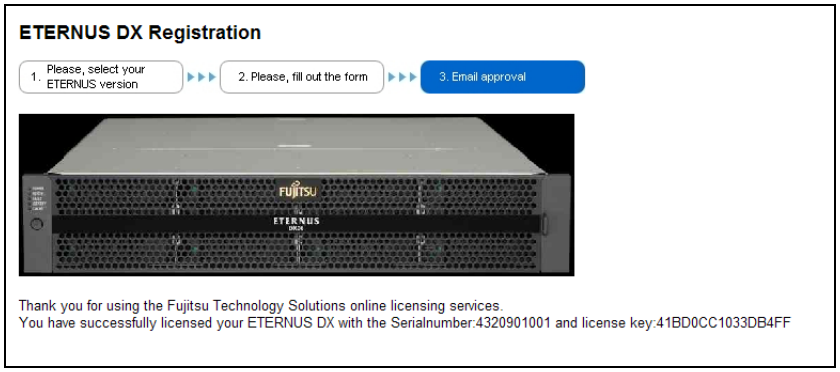
ETERNUS DX Registration
1. Please, select your ETERNUS version
2. Please, fill out the form
3. Email approval
Thank you for using the Fujitsu Technology Solutions online licensing services.
You have successfully licensed your ETERNUS DX with the Serialnumber:4320901001 and license key:41BD0CC1033DB4FF

Figure 7.27 Advanced Copy Feature License Key Web Screen 3

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IMPORTANT Make sure to take a note of the displayed license key.

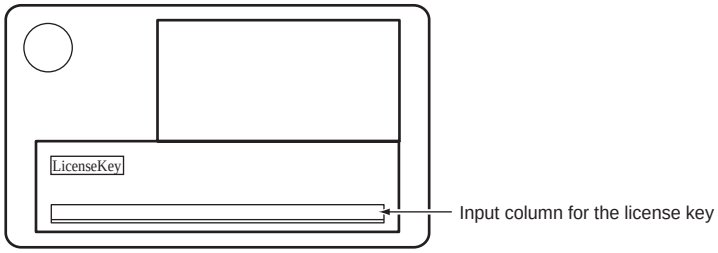
2 Check the contents of the notification E-mail.

Check that the [Serial number] (device serial number) that is described in the notification E-mail is correct.

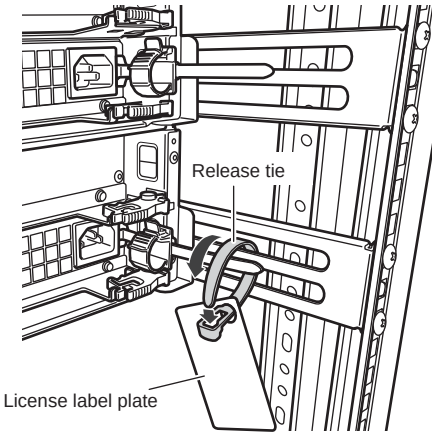
IMPORTANT If the serial number that is described in the notification E-mail is wrong, contact your sales representative as soon as possible.

3 Write down the license key on the provided license label plate.

IMPORTANT Make sure to write down the license key.
Write the license key directly on an empty column of "License Key" on the license label plate, or print the notification E-mail on paper, cut out the part of the 16-digit numeric number of license key, and attach it to the license label plate.



4 Attach the license label plate provided with the Advanced Copy Feature to the rack rail near the ETERNUS DX60/DX80 which holds its license.



End of procedure

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7.3.2 Registering the Advanced Copy License Key

Register the license key according the following procedure.

Procedure

1 Register the Advanced Copy license key.

1-1 Start GUI.

1-2 Click the [Register Copy License] under the [Advanced Copy Management] menu on the [Volume Settings] tab in the GUI screen.
The [Register Copy License] screen appears.

1-3 Input the obtained license key in the "License Key" field, and click the [Register Copy License] button.

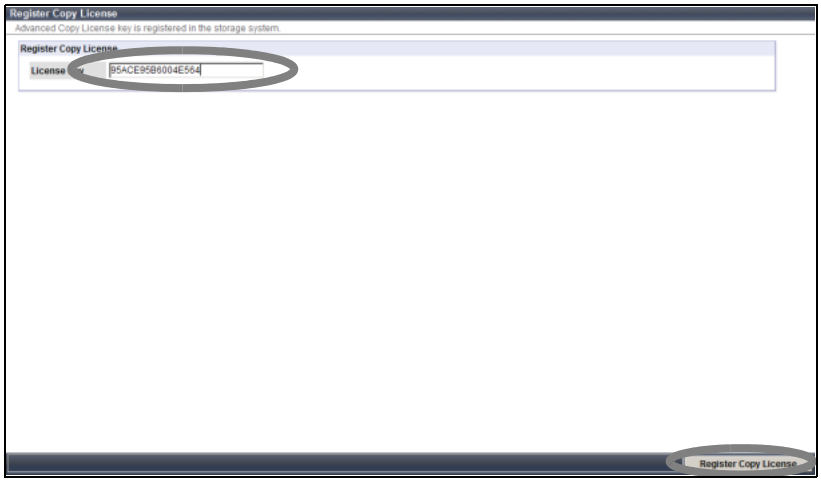
Register Copy License
Advanced Copy License key is registered in the storage system.
Register Copy License
License
Register Copy License

Figure 7.28 [Register Copy License] screen

A confirmation screen appears.

1-4 Click the [OK] button.
The Advanced Copy license is registered.

2 Check that the license key is registered.

2-1 Click the [Advanced Copy Status] menu on the [Status] tab of in the GUI screen.
The [Advanced Copy Status] screen appears.

2-2 Check that the "Advanced Copy License" is set to "Registered".

Advanced Copy Status
Displays the status and various properties of active Advanced Copy Sessions.
Advanced Copy Status
Registered
Session Type

Figure 7.29 [Advanced Copy Status] screen

End of procedure

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7.3.3 Advanced Copy Settings

For settings and operations to use the Advanced Copy functions, refer to "ETERNUS DX60/DX80/DX90 Web GUI User Guide" or "ETERNUS DX60/DX80/DX90 CLI User Guide".
For operation settings when using ETERNUS VSS Hardware Provider, refer to the ETERNUS VSS Hardware Provider manual.

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX60/DX80/DX90 CLI User Guide"
"ETERNUS VSS Hardware Provider manual"

7.4 Monitoring Setup

Perform the ETERNUS DX60/DX80/DX90 monitoring setup if required.

Note This section explains the procedure for the setup using GUI. For setting-related details, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide".
For the setup using the CLI commands, refer to "ETERNUS DX60/DX80/DX90 CLI User Guide".

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX60/DX80/DX90 CLI User Guide"

7.4.1 Event Notification Setup

Set how to notify of an event and its level when a problem occurs in the ETERNUS DX60/DX80/DX90.

Note There are four methods to notify of an event: E-Mail, SNMP trap, host sense, and REMCS (only for the ETERNUS DX90).
When notifying of an event by E-mail, "Setup E-Mail Notification" must be set. When notifying of an event by the SNMP trap, "Setup SNMP Agent" must be set. Refer to "ETERNUS DX60/DX80/DX90 Web GUI User Guide" for details of the settings.

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"

Procedure

1 Start GUI.

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2 Click [Setup Event Notification] under the [System Settings] menu on the [Global Settings] tab in the GUI screen.
The [Setup Event Notification] screen appears.

3 Select the necessary items in "Setting based on Severity".

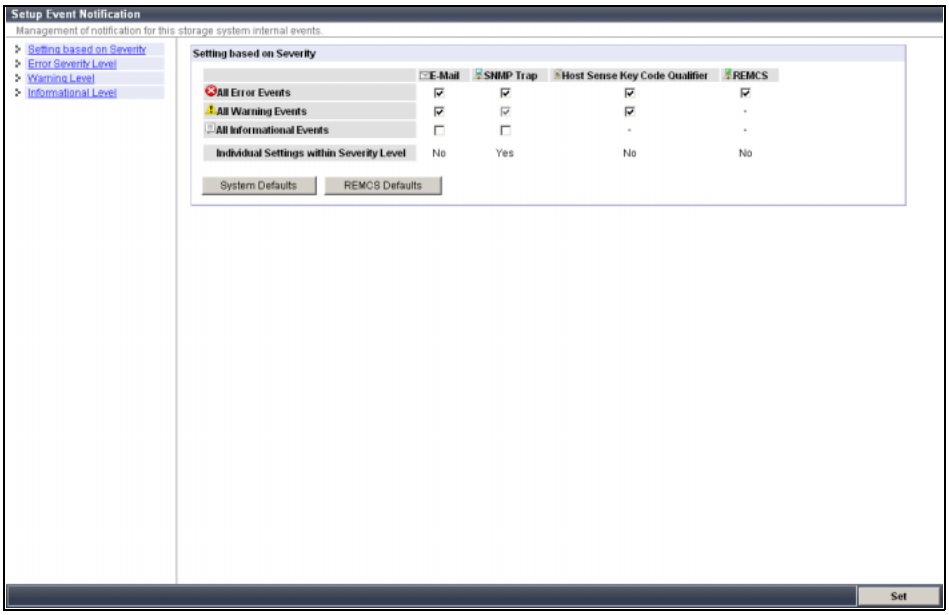

Figure 7.30 [Setup Event Notification] screen (Setting based on Severity)

4 Click the "Error Severity Level" link.
The [Error Severity Level] screen appears.

5 Select the necessary items in "Error Severity Level".

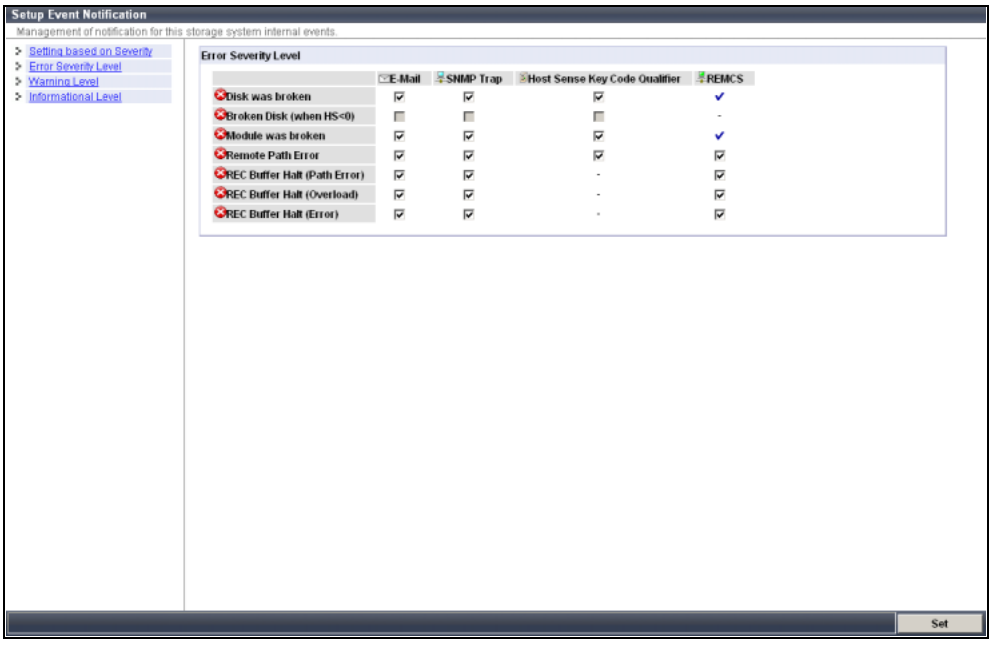

Figure 7.31 [Setup Event Notification] screen (Error Severity Level)

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6 Click the "Warning Level" link.
The [Warning Level] screen appears.

7 Select the necessary items in "Warning Level".

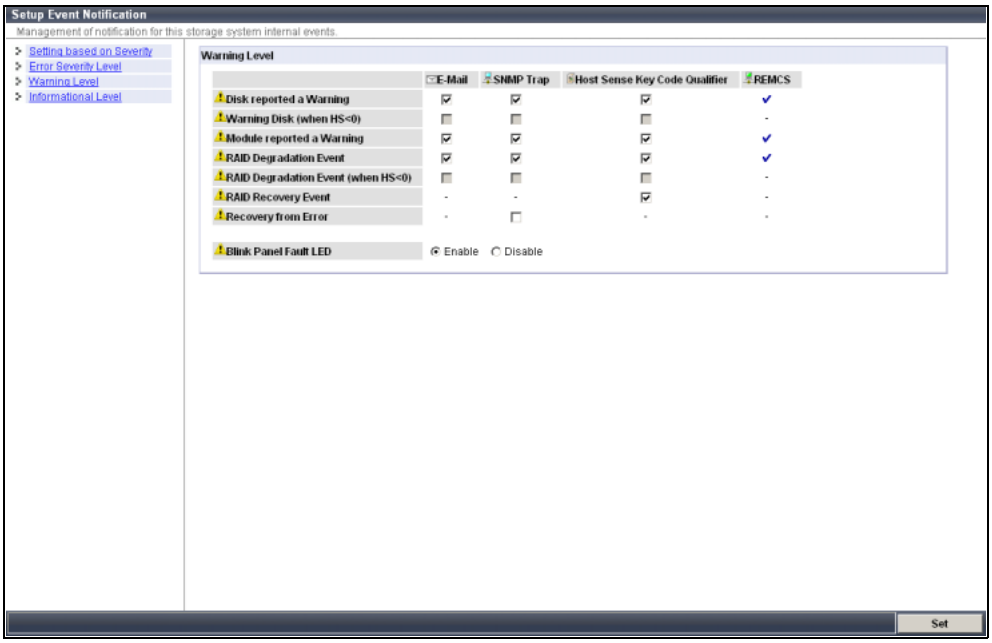

Figure 7.32 [Setup Event Notification] screen (Warning Level)

8 Click the "Informational Level" link.
The [Informational Level] screen appears.

9 Select the necessary items in "Informational Level".

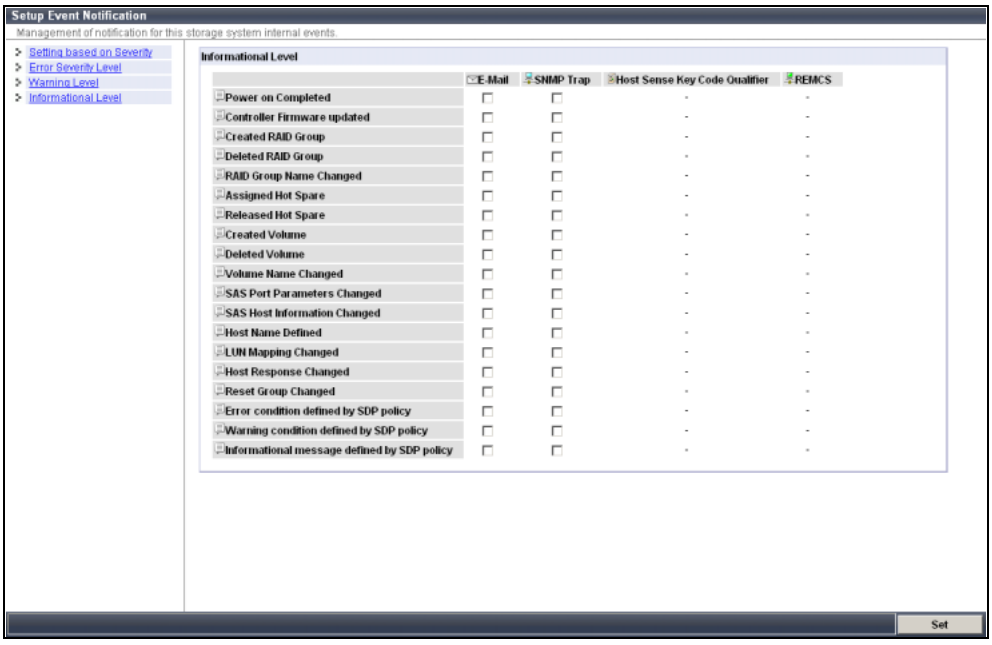

Figure 7.33 [Setup Event Notification] screen (Informational Level)

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10 After the necessary settings have completed, click the [Set] button.
A confirmation screen appears.

11 Click the [OK] button.
The specified event notification setting is enabled.

End of procedure

7.4.2 E-mail Notification Setup

If an error occurs in the ETERNUS DX60/DX80/DX90, the event (error information, etc.) is reported to a specified address.
The procedure to set the E-mail notification is as follows:

Procedure

1 Start GUI.

2 Click [Setup E-Mail Notification] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Setup E-Mail Notification] screen appears.

3 Set the necessary items in the [Notification E-Mail] area.
- Select "Enable" in "Notification E-Mail".
- Specify the E-mail destination address in "Destination E-Mail Address".

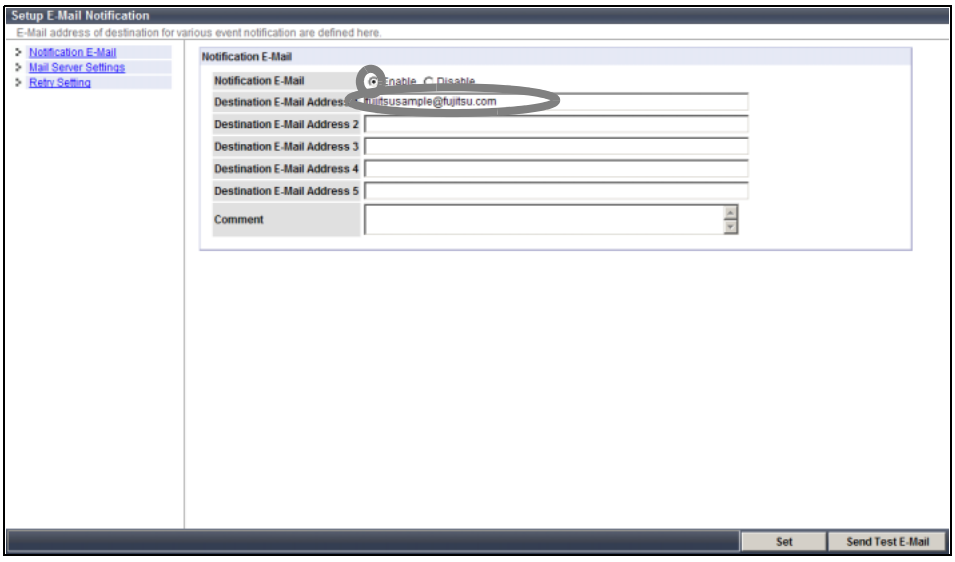

Figure 7.34 [Setup E-Mail Notification] screen (Notification E-Mail)

4 Click the "Mail Server Settings" link.
The [Mail Server Settings] screen appears.

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5 Set the necessary items in the [Mail Server Settings] area.

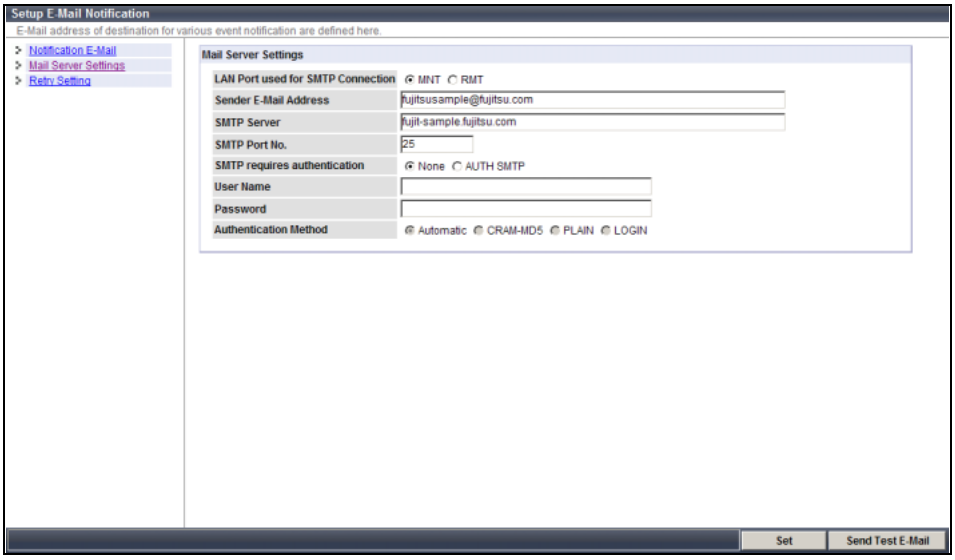

Figure 7.35 [Setup E-Mail Notification] screen (Mail Server Settings)

6 After finishing the necessary settings, click the [Set] button.

A confirmation screen appears.

7 Click the [OK] button.

The specified send E-mail setting is registered.

8 Click the [Send Test E-mail] button to check that an E-mail can be sent to the specified E-mail destination address.

Figure 7.36 Send Test E-mail

End of procedure

7.4.3 ServerView (SNMP Trap Notification) Setup

This section explains how to perform settings to monitor event notification (Trap) by SNMP using "ServerView", when the ETERNUS DX60/DX80/DX90 is connected to the Industry standard server PRIMERGY.

IMPORTANT

- Use ServerView whose version is V3.60L20 or later.
- For the details on the Industry standard server side settings, refer to "ServerView User's Guide" that is provided with the PC server.

Refer "ServerView User's Guide"

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Also, for events that are detected by ServerView when monitoring the device, refer to "Appendix B Events detected by ServerView" (page 229).

Procedure

1 Set the network environment of the ETERNUS DX60/DX80/DX90.

When the ETERNUS DX60/DX80/DX90 and ServerView management device are in different subnet environments, set the Gateway IP address and destination network address in the [Setup Network Environment] screen of GUI.

1-1 Start GUI.

1-2 Click [Setup Network Environment] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Setup Network Environment] screen appears.

1-3 Specify the necessary items, and click the [Set] button.
Enter the default gateway and any "Allowed IP List" devices.

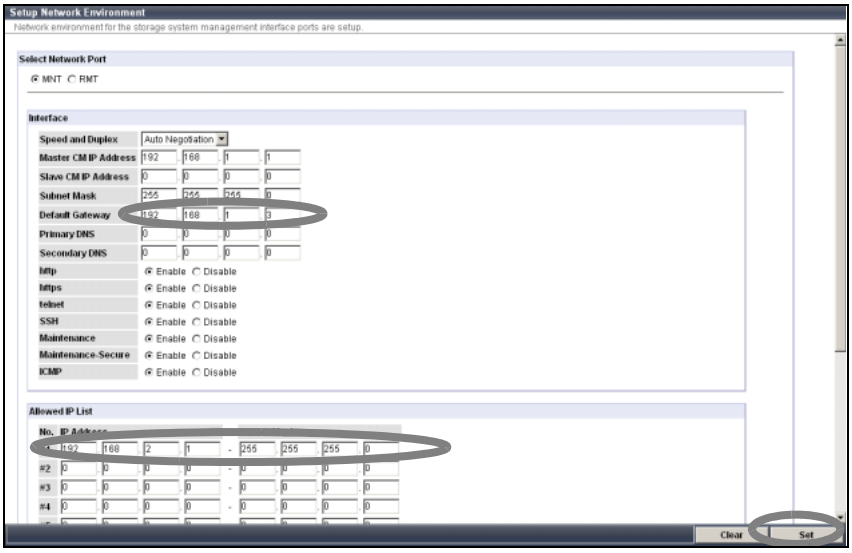

Figure 7.37 [Setup Network Environment] screen (when ServerView is running)

A confirmation screen appears.

1-4 Click the [OK] button.
The network environment is set, and the [Setup Network Environment] screen is closed.

2 Set up destination of SNMP Trap.

2-1 Select [Setup SNMP Agent] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Setup SNMP Agent] menu screen appears.

2-2 Click the [Trap] link on the left of the screen.
The SNMP Trap destination setup screen appears.

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2-3 Enter a new destination for the SNMP Trap, and click the [Add New Destination] button.

- Enter the IP address of the ServerView management device (SNMP Manager) in "IP Address".
- Enter the Community name to transfer the SNMP Trap to (if not specified, "public" is used) in "Community Name".

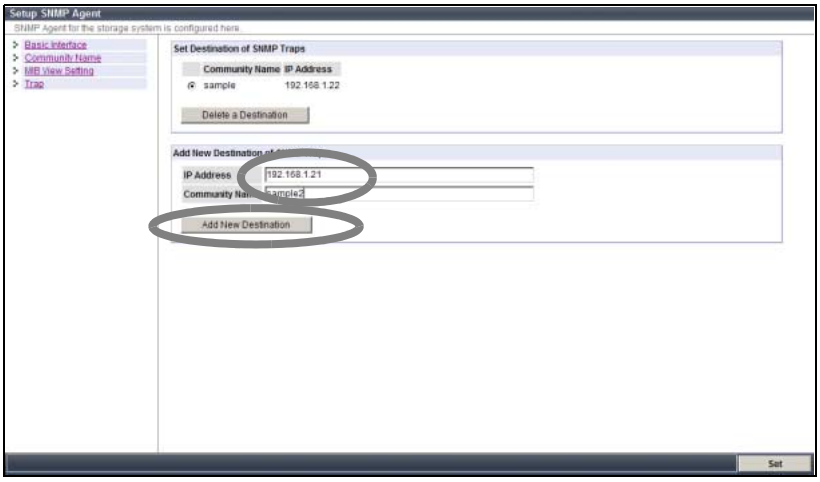

Figure 7.38 [Trap] screen

The new destination for the SNMP is added in the "Set Destination of SNMP Traps" field.

2-4 Click the [Set] button.
A confirmation screen appears.

2-5 Click the [OK] button.
The settings are reflected.

3 Download the MIB definition file for SeverView monitoring.

Export the MIB definition file for ServerView monitoring (FJDARY-E60.MIB) in the ETERNUS DX60/DX80/DX90.

3-1 Click the [Download MIB File] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Download MIB File] screen appears.

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3-2 Select the checkbox of "The ServerView control code is added to the comment line of the MIB definition file" in "Option", and click the [Download] button.

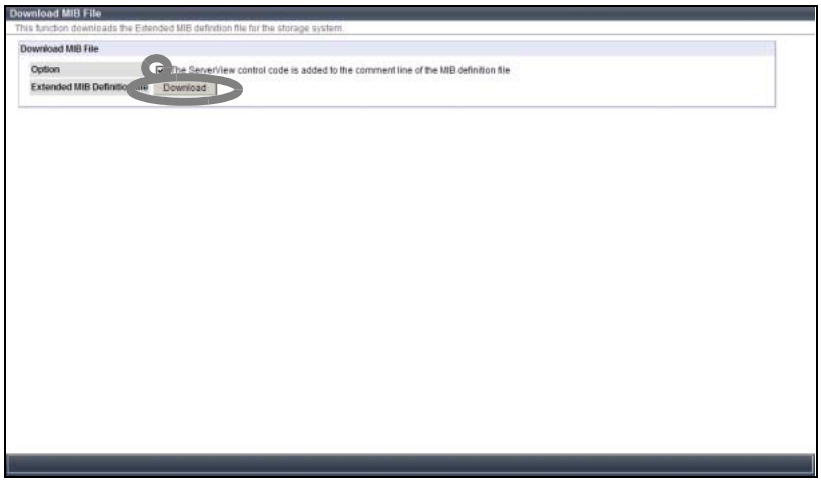
Download MIB File
This function downloads the Extended MIB definition file for the storage system.
Download MIB File
Option
The ServerView control code is added to the comment line of the MIB definition file
Extended MIB Definition file
Download

Figure 7.39 [Download MIB File] screen

A confirmation screen appears.

3-3 Click the [OK] button.
The MIB definition file for SeverView monitoring is downloaded. A screen to save the downloaded MIB definition file appears.

3-4 Save the downloaded file.

4 Set ServerView.

Install and set ServerView on the Industry standard server side.
Refer to "ServerView User's Guide" that is provided with the Industry standard server to install and set ServerView.

IMPORTANT	When registering the MIB information of an optional device, make sure to specify "FJDARY-E60.MIB" that was exported in Step 3 Download the MIB definition file for SeverView monitoring.

5 Confirm notification for when an event occurs.

After setting up the ETERNUS DX60/DX80/DX90 and Industry standard server, sending trap from the ETERNUS DX60/DX80/DX90 (SNMP Agent) to the Industry standard server (SNMP Manager) can be confirmed by performing SNMP Trap Test.

5-1 Start GUI.

5-2 Click [Perform SNMP Trap Test] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Perform SNMP Trap Test] screen appears.

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5-3 Click the [Send] button.

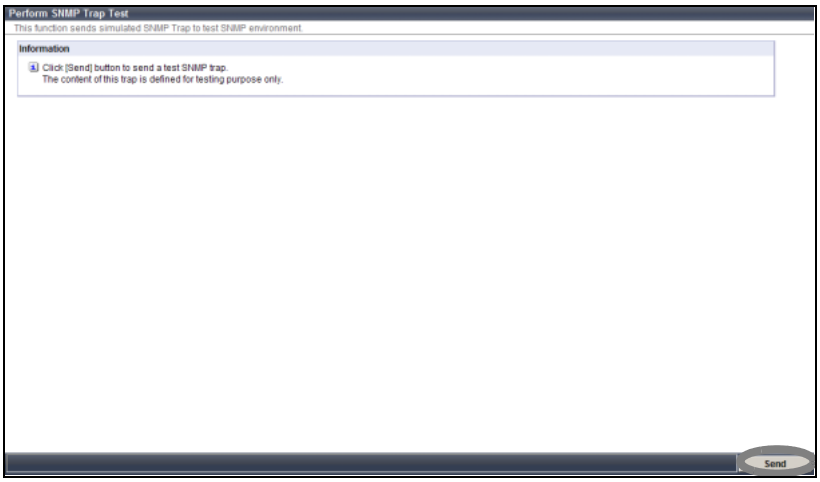
Perform SNMP Trap Test
This function sends simulated SNMP Trap to test SNMP environment.
Information
Click [Send] button to send a test SNMP trap.
The content of this trap is defined for testing purpose only.
Send

Figure 7.40 [Perform SNMP Trap Test] screen

A confirmation screen appears.

5-4 Click the [OK] button.
The SNMP Trap Test is performed.

5-5 Confirm that the SNMP notification (Item fault) is displayed.
The Item fault message (hardware failure report) displayed by this sending test does not show actual failure.
If a message is not displayed, check that the network has no trouble, and the settings for the ETERNUS DX60/DX80/DX90 is correct.

- Is the LAN between ServerView management device and ETERNUS DX60/DX80/DX90 connected correctly?
  Execute the "ping" command from MS-DOS prompt of the ServerView management device, confirm reply from ETERNUS DX60/DX80/DX90.

```
> ping IP address of ETERNUS DX60/DX80/DX90
```

(Example)

```
> ping 192.168.1.180
```

If the following messages are output, the LAN is connected correctly.

```
Pinging 192.168.1.180 with 32 bytes of data:

Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
```

If the above messages are not displayed, check LAN related items such as LAN cable (for operation management), network environment settings of ETERNUS DX60/DX80/DX90, and LAN card setup of ServerView management device.

- Is ServerView set correctly to monitor the ETERNUS DX60/DX80/DX90?
- Is the notification receiver of ETERNUS DX60/DX80/DX90's SNMP trap set correctly?

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Start GUI and check if ServerView management device's IP address is set correctly in the Trap setting of [Setup SNMP Agent].

End of procedure

7.4.4 Remote Support Setup

When using remote support service, set to report any ETERNUS DX60/DX80/DX90 problems to the remote support center.

Note

Remote support service enables problems to be found and resolved quickly.

The following explains how to set the device for remote support.
In the remote support setting, register the setting environment to connect to the remote support center, and customer information to send to the remote support center.
For details on the setting, refer to "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"

Procedure

1. Start GUI.
2. Click [Setup Remote Support] under the [Remote Support] menu on the [Global Settings] tab in the GUI screen.
   The [Setup Remote Support] screen appears.

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3 Set each item under "Customer Information" and "Communication Environment Information" in the [Setup Remote Support] screen.

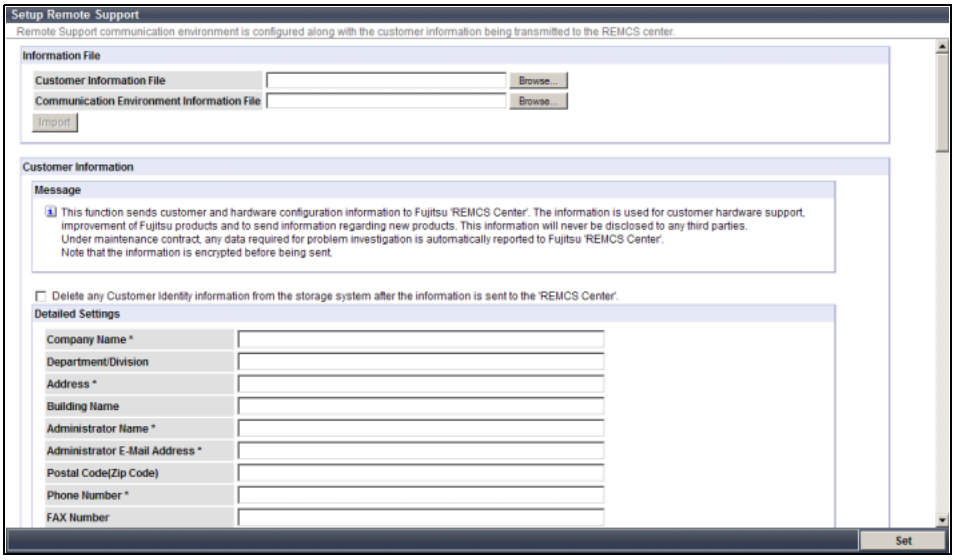
Setup Remote Support
Remote Support communication environment is configured along with the customer information being transmitted to the REMCS center.
Information File
Customer Information File
Browse...
Communication Environment Information File
Browse...
Import
Customer Information
Message
This function sends customer and hardware configuration information to Fujitsu 'REMCS Center'. The information is used for customer hardware support, improvement of Fujitsu products and to send information regarding new products. This information will never be disclosed to any third parties. Under maintenance contract, any data required for problem investigation is automatically reported to Fujitsu 'REMCS Center'. Note that the information is encrypted before being sent.
Delete any Customer Identity information from the storage system after the information is sent to the 'REMCS Center'.
Detailed Settings
Company Name *
Department/Division
Address *
Building Name
Administrator Name *
Administrator E-Mail Address *
Postal Code(Zip Code)
Phone Number *
FAX Number
Set

Figure 7.41 [Setup Remote Support] screen

4 Click the [Set] button.

The set information is sent to the Remote Support center, and the connection between the ETERNUS DX60/DX80/DX90 and Remote Support center is checked. The result of connection check is sent to "Mail Address".

End of procedure

7.5 Server Connection Setup

Perform the settings required to connect to the server and install the required drivers. Perform the settings required for network devices connecting the server and the ETERNUS DX60/DX80/DX90. Check the connection between the server and the device.

Refer

"ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS DX Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS DX Disk storage systems Server Connection Guide (SAS)"
Manuals of the drives to be installed

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7.6 System Status Check

Check the following status using GUI or CLI.

- ETERNUS DX60/DX80/DX90 parts status
- RAID group status
- Volume status

Note

This section explains the procedure using GUI. For the setup using the CLI commands, refer to "ETERNUS DX60/DX80/DX90 CLI User Guide".

For status check details, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide".

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"

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Component status display

The status of the ETERNUS DX60/DX80/DX90 can be checked by general status in the upper left of GUI screen.

When the general status image is Normal, the ETERNUS DX60/DX80/DX90 is in normal status.

When the general status image is other than Normal (Error, Warning, etc.), an abnormality has been detected in the ETERNUS DX60/DX80/DX90. Check the status of each component on the Storage System Status screen.

On the device tree in the left of the Storage System Status screen, components whose status is ⊗ or ⚠ have a failure or require preventive maintenance. Contact your sales representative or maintenance engineer.

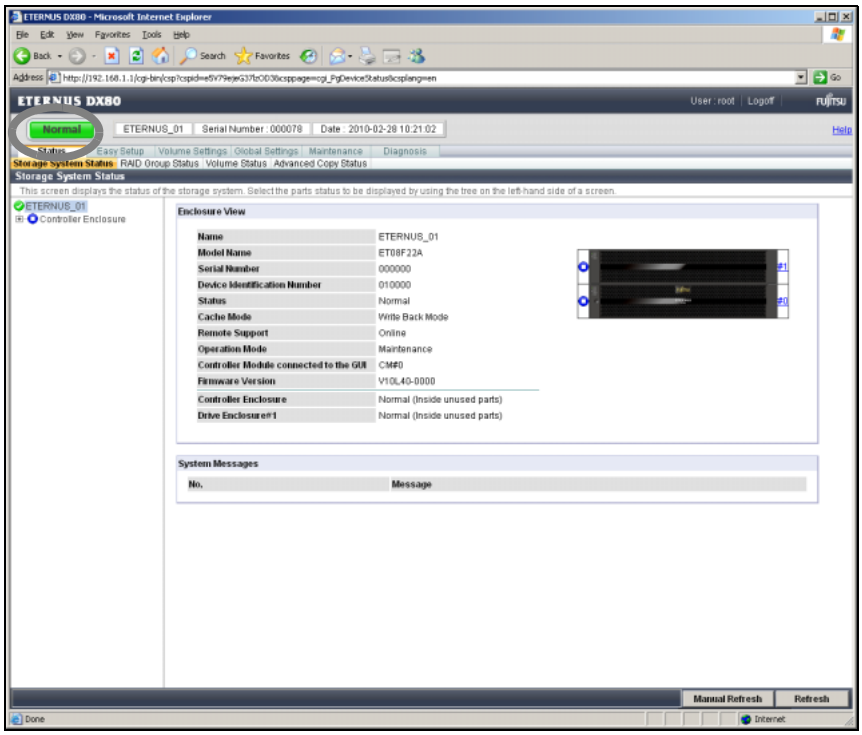

Figure 7.42 Storage System Status screen

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Display RAID group status

On the RAID Group Status screen of GUI, the status of RAID groups that you have registered is displayed. Check if RAID configuration is set correctly.

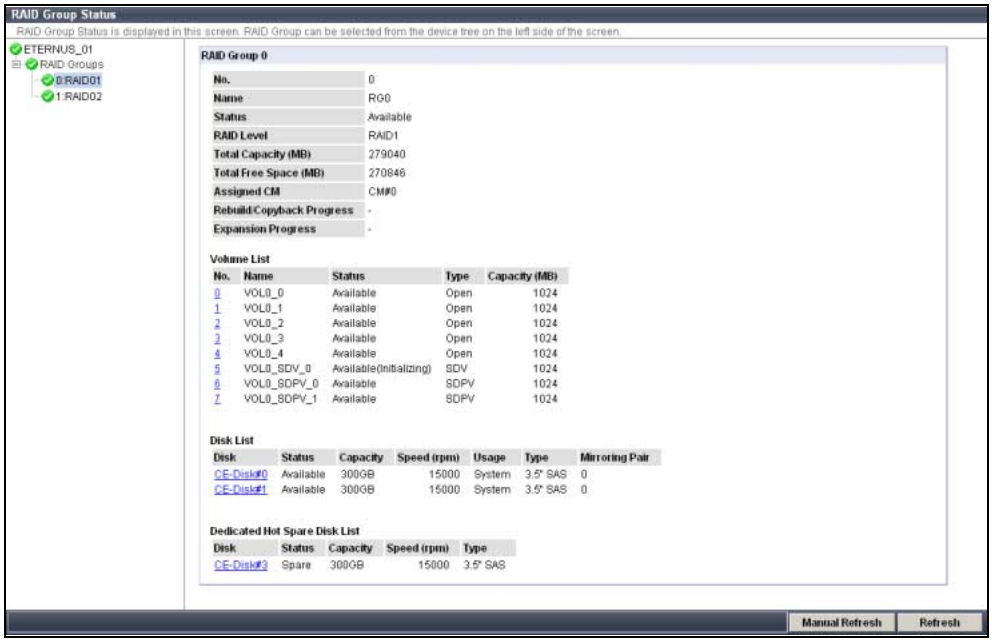
RAID Group Status
RAID Group Status is displayed in this screen. RAID Group can be selected from the device tree on the left side of the screen.
ETERNUS_01
RAID Groups
0:RAID01
1:RAID02
RAID Group 0
No. 0
Name RG0
Status Available
RAID Level RAID1
Total Capacity (MB) 279040
Total Free Space (MB) 270848
Assigned CM CM#0
Rebuild/Copyback Progress -
Expansion Progress -
Volume List
No. Name Status Type Capacity (MB)
0 VOL0_0 Available Open 1024
1 VOL0_1 Available Open 1024
2 VOL0_2 Available Open 1024
3 VOL0_3 Available Open 1024
4 VOL0_4 Available Open 1024
5 VOL0_SDV_0 Available(Initializing) SDV 1024
6 VOL0_SDPV_0 Available SDPV 1024
7 VOL0_SDPV_1 Available SDPV 1024
Disk List
Disk Status Capacity Speed (rpm) Usage Type Mirroring Pair
CE-Disk#0 Available 300GB 15000 System 3.5" SAS 0
CE-Disk#1 Available 300GB 15000 System 3.5" SAS 0
Dedicated Hot Spare Disk List
Disk Status Capacity Speed (rpm) Type
CE-Disk#3 Spare 300GB 15000 3.5" SAS
Manual Refresh
Refresh

Figure 7.43 RAID Group Status screen

Display volume status

On the Volume Status screen of GUI, the status of volumes that you have registered is displayed. Check if volumes are set correctly.

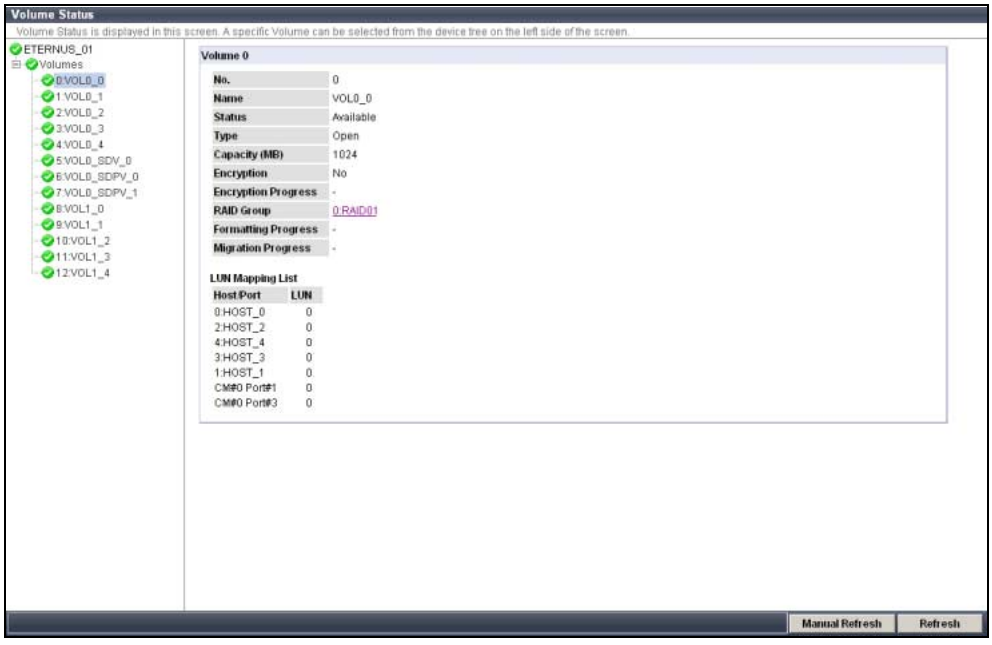

Figure 7.44 Volume Status screen

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Chapter 8 Installing Optional Products

The following optional products may be installed while the ETERNUS DX60/DX80/DX90 is running (hot-expansion procedures).

- Disk
- Drive Enclosure

This chapter explains how to install these optional products.

Be sure to read "ETERNUS DX60/DX80/DX90 Disk storage system Using Optional Products" before performing any of these installation procedures.

"ETERNUS DX60/DX80/DX90 Disk storage system Using Optional Products"

8.1 Disk Installation

This section describes how to install optional disks in the ETERNUS DX60/DX80/DX90.

8.1.1 Disk Handling Instructions

■ About condensation

CAUTION

Do

- When moving a disk from a cold place, such as an un-conditioned store house in winter, to a warmer places such as an air-conditioned room, the severe temperature change may result in condensation forming.
  To avoid this, allow the packed disks sufficient time in the warmer place (one hour for each 15°C of temperature difference) to adapt to the new temperature.

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About static electricity

CAUTION

Do

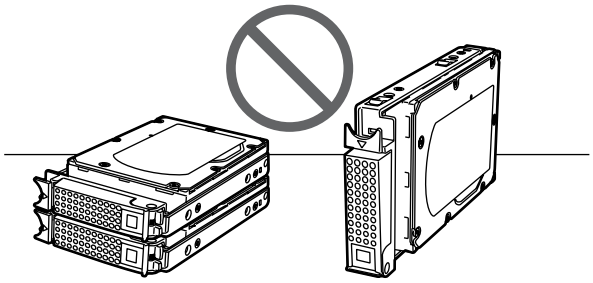
- When handling disks, make sure to wear a wrist strap. Failure to discharge static electricity may cause device failure.
  Do not remove it until the operation is complete.
- Leave the disk in its package until ready to install it.
- Do not touch the circuitry on boards or soldered parts when handling the disks.

About shock

CAUTION

Do Not

- Do not lay the disks directly on a desk or similar hard surface. Always use a rubber mat or other soft material to cushion the disks against physical shocks.
- Do not stand the disks on end.



- Do not apply external force to the interface connectors.
- Do not knock or drop the disks on hard objects.

8.1.2 Installable Disks

Refer to "A.2.1 Disks" (page 221) for a list of disks that may be installed.
At the time of purchase, the disk model names may be different from those described.
The latest manual is available via the following web-site, and should be referred to as necessary.

http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx-entry/

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8.1.3 Disk Installation Positions

This section explains the disk installation positions.

- 3.5" disks
  3.5" disks can be installed in the front of the 3.5" type controller enclosure or 3.5" type drive enclosure, as shown in Figure 8.1.

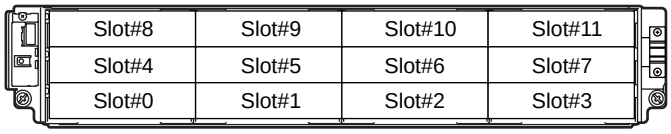

Figure 8.1 Position of 3.5" disk slots

- 2.5" disks
  2.5" disks can be installed in the front of the 2.5" type controller enclosure or 2.5" type drive enclosure, as shown in Figure 8.2.

Figure 8.2 Position of 2.5" disk slots

8.1.4 Additional Disk Installation Procedure

This section describes how to install additional disks in the ETERNUS DX60/DX80/DX90.

WARNING

Do Not

- Do not install any disks that are not FUJITSU authorized, as they may damage the device and/or cause fire or electrical shock.
- Do not damage or modify the internal cables or ETERNUS DX60/DX80/DX90 when installing the disks, as this may damage the device and/or cause fire or electrical shock.
- Do not remove system disks. Doing so will render the ETERNUS DX60/DX80/DX90 unusable.

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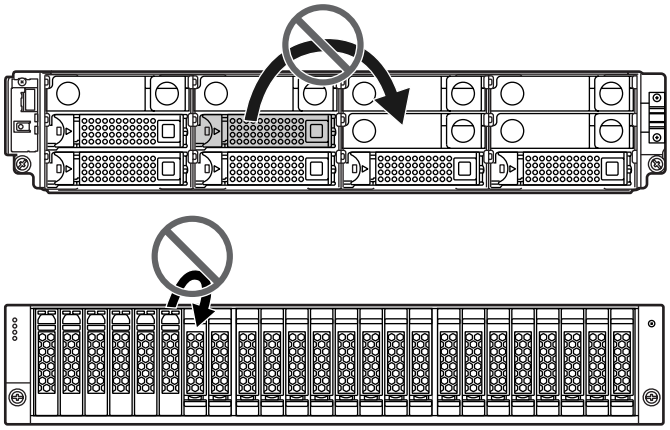
CAUTION

Do

- If additional disks are installed in a way other as described herein, damage and/or device failure or electrical shock may occur.
- Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



Do Not

- Do not install disks that are for use in other devices.

For 3.5" disks

Procedure

1. Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" and check that no items are missing.

   Refer "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"

2. Check that all components of the ETERNUS DX60/DX80/DX90 are in normal status, using the Storage System Status screen of GUI.

3. Remove the front cover.

   For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

4. Wear a wrist strap.

   For how to wear a wrist strap, refer to "3.6 Wearing the Wrist Strap" (page 81).

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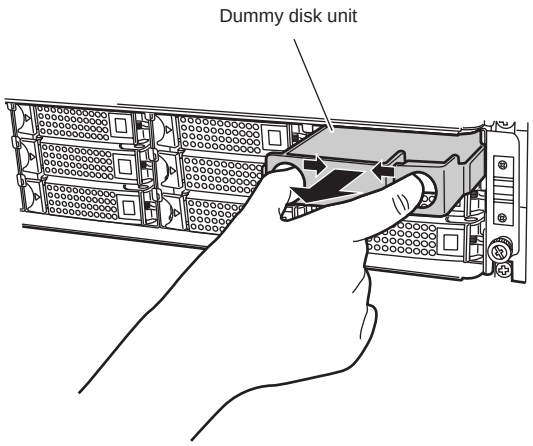
5 Remove the dummy disk unit from the slot in which the disk is to be installed.

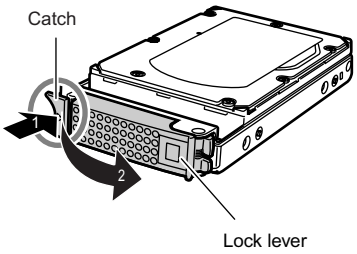
Hook your fingers and push into the holes of the dummy disk unit, and pull it straight out of the disk slot.



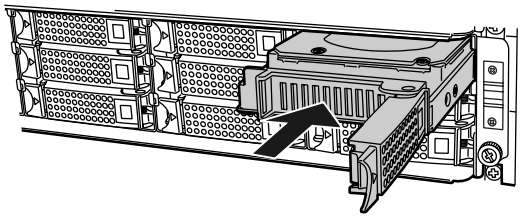
IMPORTANT The removed dummy disk unit should be retained for future use.

6 Install the new disk.

6-1 Press the catch on the disk lock lever to unlock it.



6-2 Insert the disk all the way into in the slot, making sure that it is firmly seated and keeping the lock lever open.



IMPORTANT
- Hold the disk with both hands to protect against jarring.
- Insert the disk until the lock lever hooks reach the slot protrusions.

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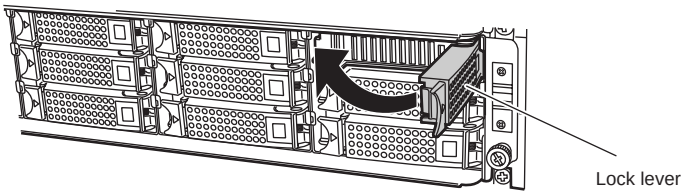
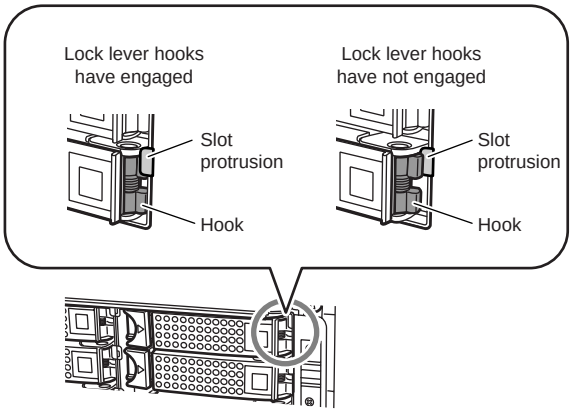
6-3 Swing the lock lever in the direction of the arrow, until the lock clicks shut.



IMPORTANT Make sure that the lock lever hooks have engaged the slot protrusions.



6-4 Check that the newly installed disk's DISK READY/FAULT LED lights up green after approximately 30 seconds.

7 Repeat Step 5 and Step 6 for each additional disk.

8 Remove the wrist strap.

9 Re-attach the front cover.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

10 On the Storage System Status screen of GUI, check that the added disks have been recognized.

11 Set up RAID groups, volumes, hot spares, and Host Affinity settings on the new disks, as required.

End of procedure

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For 2.5" disks

Procedure

1 Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" and check that no items are missing.

Refer "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"

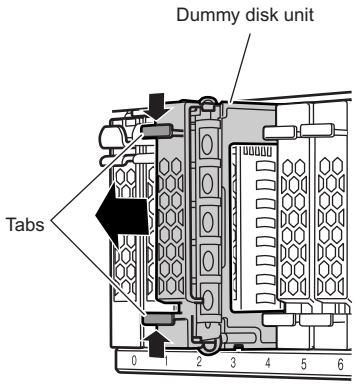
2 Check that all components of the ETERNUS DX60/DX80/DX90 are in normal status, using the Storage System Status screen of GUI.

3 Wear a wrist strap.

For how to wear a wrist strap, refer to "3.6 Wearing the Wrist Strap" (page 81).

4 Remove the dummy disk unit from the slot in which the disk is to be installed.

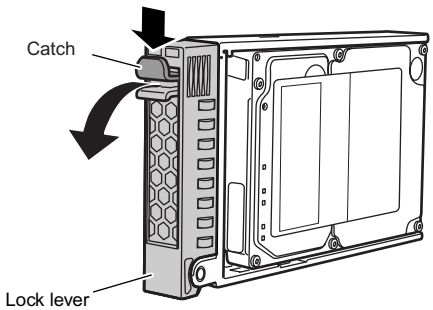
Simultaneously push into the tabs in the upper and lower parts of the dummy disk unit, and pull it straight out of the disk slot.



IMPORTANT The removed dummy disk unit should be retained for future use.

5 Install the new disk.

5-1 Press the catch on the disk lock lever to unlock it.



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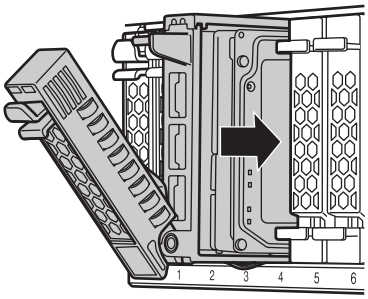
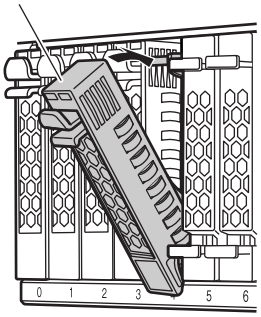
5-2 Insert the disk all the way into in the slot, making sure that it is firmly seated and keeping the lock lever open.



IMPORTANT Hold the disk with both hands to protect against jarring.

5-3 Swing the lock lever in the direction of the arrow, until the lock clicks shut.

Lock lever



5-4 Check that the newly installed disk's DISK READY LED lights up green after approximately 30 seconds.

6 Repeat Step 4 and Step 5 for each additional disk.

7 Remove the wrist strap.

8 On the Storage System Status screen of GUI, check that the added disks have been recognized.

9 Set up RAID groups, volumes, hot spares, and Host Affinity settings on the new disks, as required.

End of procedure

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8.2 Drive Enclosure Installation

This section describes how to install a drive enclosure in the ETERNUS DX60/DX80/DX90.

8.2.1 Drive Enclosure Handling Instructions

About condensation

CAUTION

Do

- When moving a drive enclosure from a cold place, such as an un-conditioned store house in winter, to a warmer place such as an air-conditioned room, the severe temperature change may result in condensation forming.
  To avoid this, allow the packed drive enclosures sufficient time in the warmer place (one hour for each 15°C of temperature difference) to adapt to the new temperature.

About static electricity

CAUTION

Do

- When handling the drive enclosure, make sure to wear a wrist strap. Failure to discharge static electricity may cause device failure.
  Do not remove it until the operation is complete.

About shock

CAUTION

Do Not

- Do not handle the drive enclosure roughly or subject it to physical shocks when laying it down.
- Do not stack the drive enclosures.
- Do not knock or drop the drive enclosure on hard objects.

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8.2.2 Installable Drive Enclosures

Refer to "A.2.2 Drive Enclosures" (page 225) for a list of drive enclosures that may be installed.

- ETERNUS DX60 drive enclosures
  Up to one 3.5" type drive enclosure can be installed in the 3.5" disk model.

  Note
  Drive enclosures cannot be installed in the ETERNUS DX60 2.5" disk model.

- ETERNUS DX80/DX90 drive enclosures
  - Up to nine 3.5" type drive enclosures can be installed in the 3.5" disk model.
  - Up to four 2.5" type drive enclosures can be installed in the 2.5" disk model. 3.5" type drive enclosures may also be in the 2.5" disk model. In this case, the maximum number of disks allowed determines the maximum number of drive enclosures that may be installed.

At time of purchase, the drive enclosure model may be different from those described.
The latest manual is available via the following web-site, and should be referred to as necessary.

http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx-entry/

8.2.3 Drive Enclosure Rack Installation Procedure

This section describes how to install a drive enclosure in a rack.

CAUTION

Do

- If drive enclosures are installed in a way other as described herein, damage and/or device failure or electrical shock may occur.
- Make sure to install the drive enclosures in order, above the controller enclosure.
- Do not install drive enclosures with cables, such as power cords, connected.
- The drive enclosure contains delicate components, and should be handled gently. Do not drop or knock the drive enclosure against the rack when installing it. Also, do not knock the other devices installed in the rack.
- When no other components are to be installed in a drive slot, install the dummy disk units provided with the rack.

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IMPORTANT

- When expanding multiple drive enclosures, by installing them into the rack or expanding settings via GUI, make sure to expand one by one.
- Do not install the miniSAS cable (for drive enclosures) or power cord when installing the drive enclosure in the rack. Connect them in Step 5 and Step 6 in "8.2.4 Additional Drive Enclosure Installation".
- Install the disk after expanding the drive enclosure.

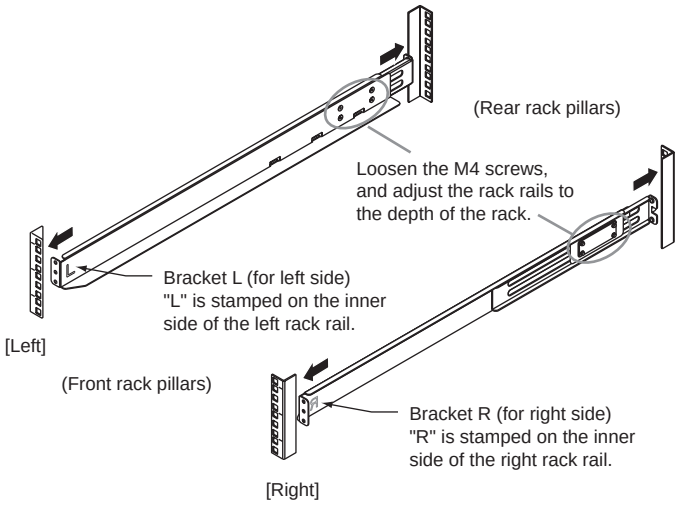
Procedure

1 Refer to "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents" and check that no rack mount kit components are missing.

Refer "ETERNUS DX60/DX80/DX90 Disk storage system Package Contents"

2 Adjust the rack rails (bracket L (for left side) and bracket R (for right side)) sizes to fit the rack.

Reposition the M4 screws to adjust the length of the rack rails (brackets) to match the distance between the front and rear rack pillars. Leave the M4 screws slightly unscrewed, as the bracket must be attached to the rack before they can be completely tightened.


(Rear rack pillars)
Loosen the M4 screws, and adjust the rack rails to the depth of the rack.
Bracket L (for left side) "L" is stamped on the inner side of the left rack rail.
[Left]
(Front rack pillars)
Bracket R (for right side) "R" is stamped on the inner side of the right rack rail.
[Right]

3 Attach the rack rails (brackets) to the rack.

Note

- If the rack pillars have square (approx. 9mm) holes, screw holders will need to be used when attaching the rack rails (brackets).
- Make sure to attach the rack rails (brackets) and rack pillars so that they fit exactly together without any space between them.

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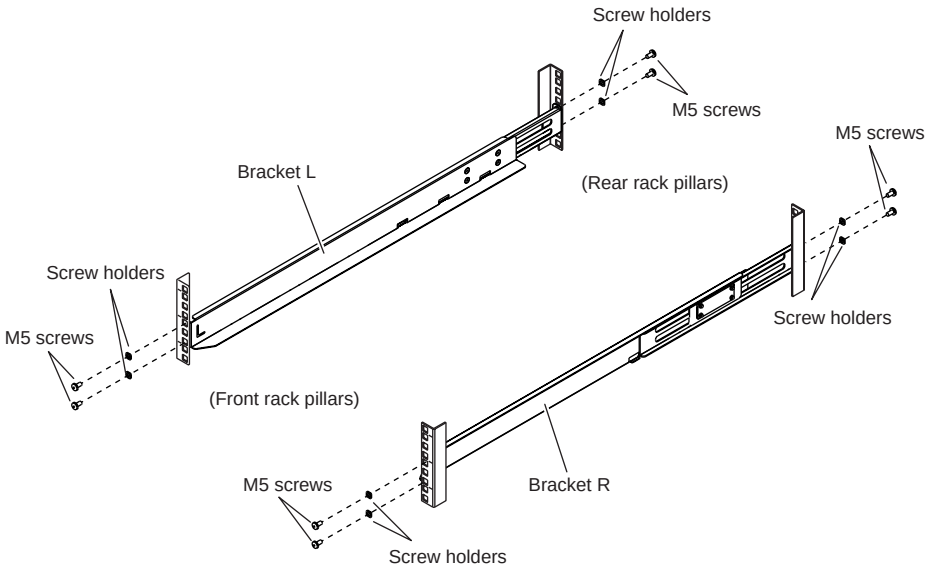
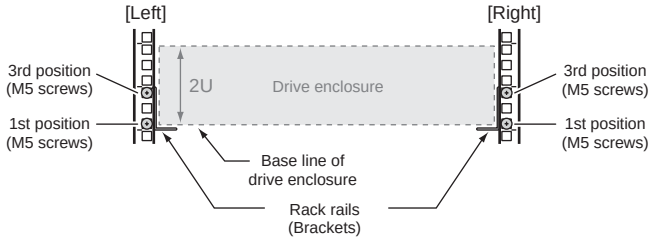


The four M5 screw positions for the rack rails (brackets) are determined relative to the drive enclosure base line.
The M5 screws should be inserted in the 1st and 3rd holes above the base line.



4 Tighten the M4 screws of the rack rails (brackets) that were slightly unscrewed in Step 2.

5 For 3.5" type drive enclosures, remove the front cover.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

6 Install the drive enclosure in the rack.

CAUTION

Do

- When installing or removing the drive enclosure to or from the rack, make sure to have the right and left sides and the bottom of the drive enclosure by two or more people. Failure to do so may cause injury.

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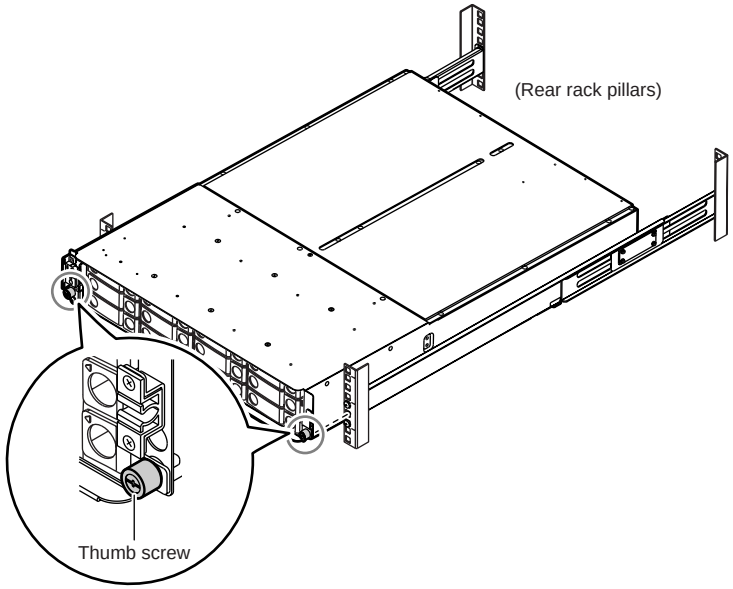
7 Fix the drive enclosure in the rack.

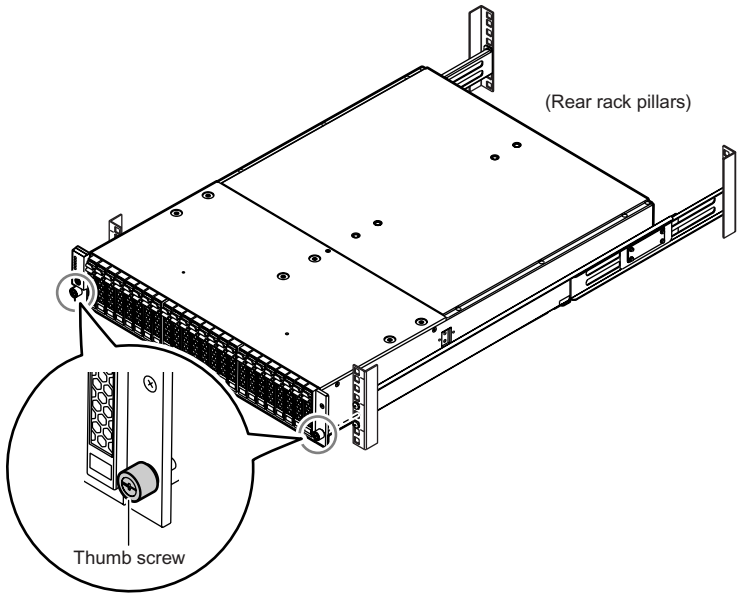
■ 3.5" type drive enclosure

Use the two thumb screws at the front of the drive enclosure to fasten it in the rack.



■ 2.5" type drive enclosure

- Use the thumb screw to fasten the front right of the drive enclosure to the rack.
- Do not fix the front left of the drive enclosure to the rack at this point.
  After all work for addition has finished, attach the supplied flange cover, and use the thumb screw to fasten the front left of the drive enclosure to the rack.



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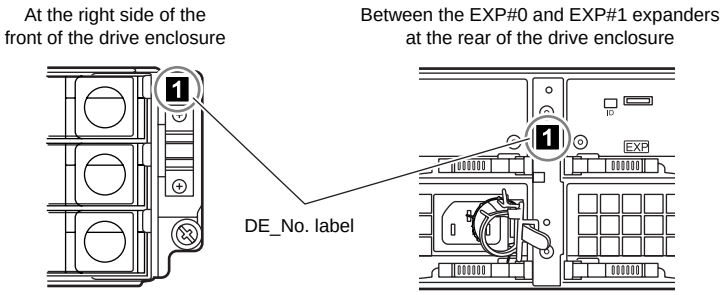
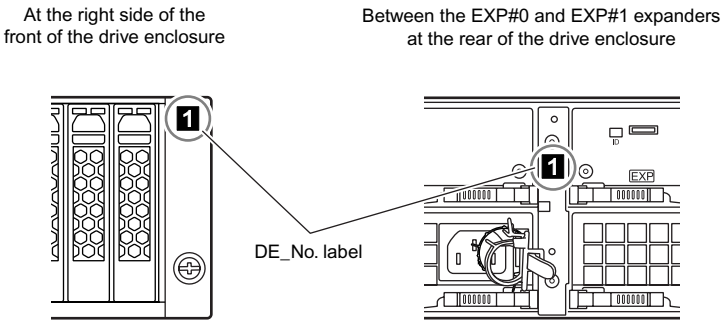
8 Attach the "DE_No." label to the following positions.

Attach the label starting at the top (miniSAS cable (for drive enclosures) connection order) on the controller enclosure.

- 3.5" type drive enclosure


At the right side of the front of the drive enclosure
Between the EXP#0 and EXP#1 expanders at the rear of the drive enclosure
1
1
EXP
DE_No. label

- 2.5" type drive enclosure


At the right side of the front of the drive enclosure
Between the EXP#0 and EXP#1 expanders at the rear of the drive enclosure
1
1
EXP
DE_No. label

Note

DE_No. label is attached to the base device.

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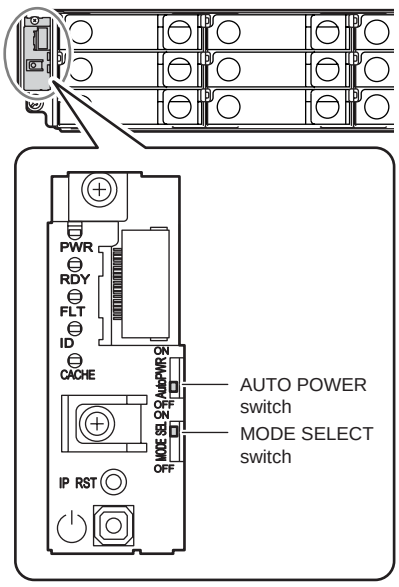
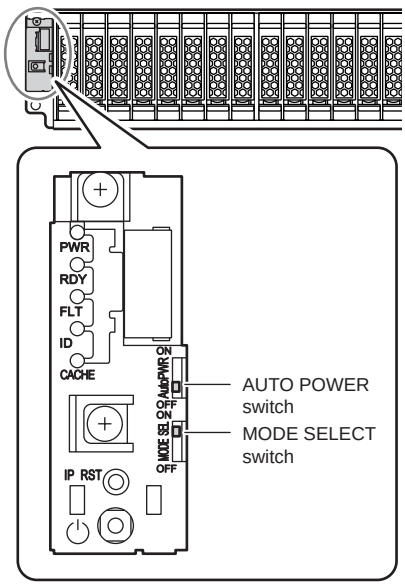
9 Check the settings of the AUTO POWER switch and the MODE SELECT switch.

- AUTO POWER switch
  Check that the AUTO POWER switch is set to the OFF position. Do not change to ON.
- MODE SELECT switch
  Check that the MODE SELECT switch is set to the ON position. Do not change to OFF.

3.5" type drive enclosure



2.5" type drive enclosure



End of procedure

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8.2.4 Additional Drive Enclosure Installation

This section describes how to install a drive enclosure for the ETERNUS DX60/DX80/DX90.

Procedure

1. First check that all the components of the ETERNUS DX60/DX80/DX90 are in normal status, using the Storage System Status screen of GUI.
2. Wear a wrist strap.
   For how to wear a wrist strap, refer to "3.6 Wearing the Wrist Strap" (page 81).
3. Click [Add Drive Enclosure] under the [Hardware Maintenance] menu on the [Maintenance] tab in the GUI screen.
   The [Add Drive Enclosure] initial screen appears.
4. Click the [Next >] button.

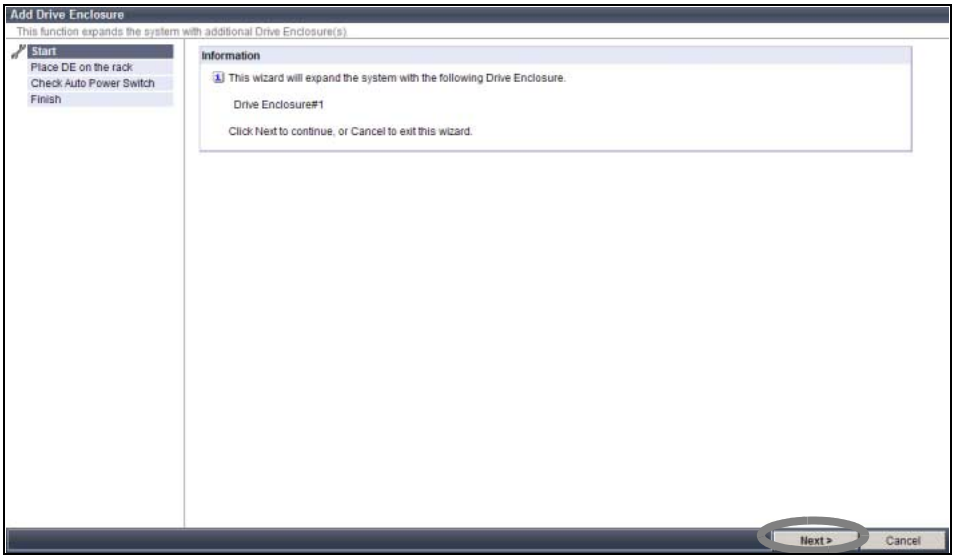
Add Drive Enclosure
This function expands the system with additional Drive Enclosure(s).
Start
Place DE on the rack
Check Auto Power Switch
Finish
Information
This wizard will expand the system with the following Drive Enclosure.
Drive Enclosure#1
Click Next to continue, or Cancel to exit this wizard.
Next >
Cancel

Figure 8.3 [Add Drive Enclosure] initial screen

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The screen that indicates a procedure for adding drive enclosures appears.

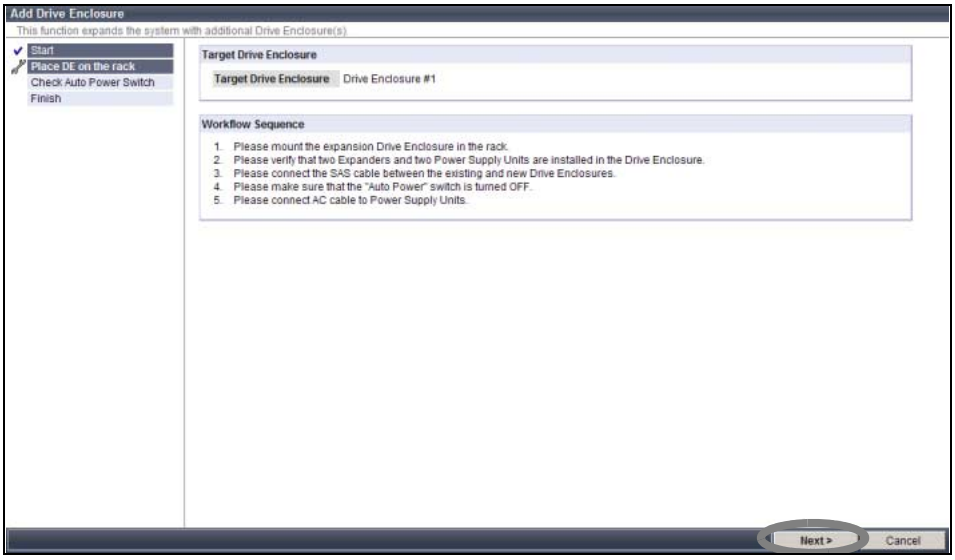

Add Drive Enclosure
This function expands the system with additional Drive Enclosure(s).
Start
Place DE on the rack
Check Auto Power Switch
Finish
Target Drive Enclosure
Target Drive Enclosure
Drive Enclosure #1
Workflow Sequence
1. Please mount the expansion Drive Enclosure in the rack.
2. Please verify that two Expanders and two Power Supply Units are installed in the Drive Enclosure.
3. Please connect the SAS cable between the existing and new Drive Enclosures.
4. Please make sure that the "Auto Power" switch is turned OFF.
5. Please connect AC cable to Power Supply Units.
Next >
Cancel

Figure 8.4 [Add Drive Enclosure] - Workflow Sequence screen 1

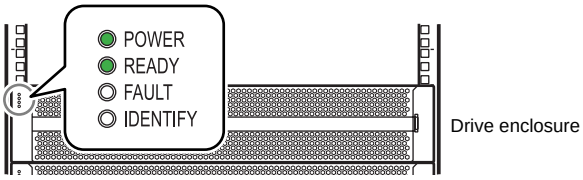
5 Connect the miniSAS cable (for drive enclosures).

Refer to "6.6 MiniSAS Cable Connection (For Drive Enclosures)" (page 117) for the appropriate procedure.

6 Connect the drive enclosure's power cord.

The drive enclosure turns on.
Refer to "6.7 Power Cord Connection" (page 123) for the appropriate procedure.

7 Check that the drive enclosure's POWER LED and READY LED are on.



8 Click the [Next >] button.

The drive enclosure recognition process is performed. When the process completes, the drive enclosure's AUTO POWER switch check procedure screen is displayed.

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9 Check the drive enclosure's AUTO POWER switch is OFF, and click the [Next >] button.

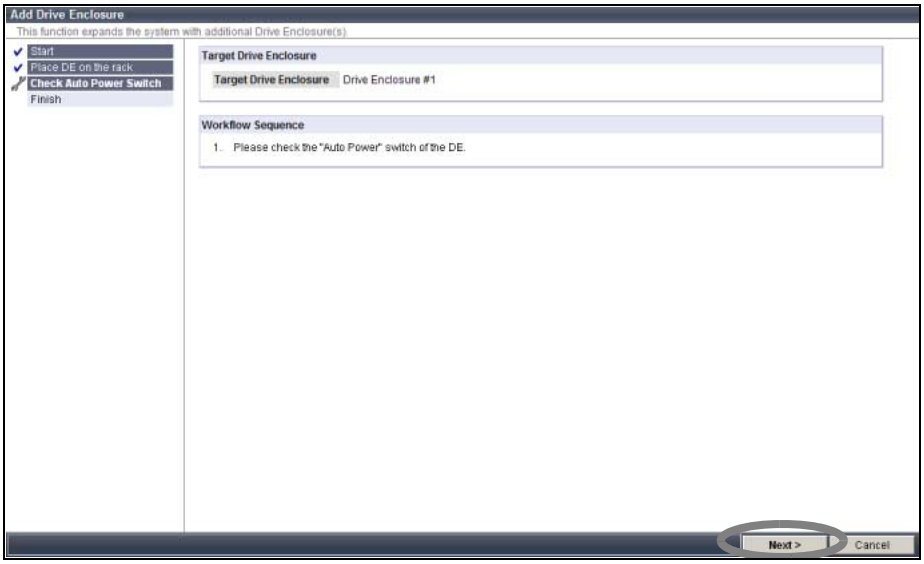

Figure 8.5 [Add Drive Enclosure] - Workflow Sequence screen 2

The expansion completion screen is displayed.

10 Click the [OK] button.

The [Add Drive Enclosure] screen is closed.

11 For 2.5" type drive enclosures, attach the supplied flange cover.

For details on how to attach the flange cover, refer to "3.4 Attaching and Removing the Flange Cover" (page 78).

12 On the Storage System Status screen, check that the added drive enclosures have been recognized.

13 Install the disks.

Refer to "8.1.4 Additional Disk Installation Procedure" (page 185) for the appropriate procedure.

14 Remove the wrist strap.

15 For 3.5" type drive enclosures, attach the front cover.

For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).

End of procedure

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Chapter 9 Operation and Maintenance

This chapter describes various operation, maintenance and troubleshooting related matters.

9.1 Checking the ETERNUS DX60/DX80/DX90 Status

Check the status of the ETERNUS DX60/DX80/DX90 regularly by checking its LEDs, or status display function of GUI or CLI.

CAUTION

Do

- Impending trouble may be indicated by the warning message LEDs of the ETERNUS DX60/DX80/DX90. The LEDs should be checked regularly to prevent any serious trouble from occurring.

Also, setting the device monitoring enables e-mail notification message or SNMP trap message of problems with the ETERNUS DX60/DX80/DX90.
Using remote report service enables automatic notification of hardware failure to remote maintenance center and enables problems to be resolved quickly.

9.2 Backing up Data

In case of a system failure, important data should be regularly backed up to a tape drive or similar device.

CAUTION

Do

- We recommend that you backup important data regularly.
  If the ETERNUS DX60/DX80/DX90 fails and the data has not been backed up, it may be lost.

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9.3 Maintenance Service

This section explains the ETERNUS DX60/DX80/DX90 maintenance service.

IMPORTANT	When performing service maintenance, the maintenance engineer connects a PC used for maintenance to the device. Also, the maintenance engineer may require information that is necessary for performing maintenance operations. If the maintenance engineer has any require, we ask that they be handled.

9.3.1 Maintenance Support Period

The maintenance support period for the ETERNUS DX60/DX80/DX90 is 5 years from the date of purchase of the ETERNUS DX60/DX80/DX90.

9.4 Post Start-of-Operation Changes to the Configuration

This section explains the procedure to change the configuration after starting the system operation, using the following example. Refer to necessary part of this section.

- Replacing Fibre Channel Cards
- Replacing LAN Cards / iSCSI HBAs
- Replacing SAS Cards

CAUTION

- When you detect abnormality of the ETERNUS DX60/DX80/DX90, Contact your maintenance engineer immediately.
- When changing the configuration, record the change by using the memo page in "ETERNUS DX Disk storage systems Server Connection Guide" and so on.

"ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS DX Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS DX Disk storage systems Server Connection Guide (SAS)"

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9.4.1 Replacing Fibre Channel Cards

The following explains how to replace a failed Fibre Channel card.
Note that this is only an overview of the replacement procedure. Refer to the relevant manuals for more details.

Refer User guide for Fibre Channel card
"ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX60/DX80/DX90 CLI User Guide"

If ETERNUS SF Storage Cruiser is installed, refer to the ETERNUS SF Storage Cruiser manuals and check necessary settings.

Refer ETERNUS SF Storage Cruiser manuals

The procedure to replace a Fibre Channel card is as follows:

Procedure

1 Before performing this procedure, use the ETERNUS DX60/DX80/DX90's GUI or CLI to check the WWN (World Wide Name) or host affinity of the Fibre Channel card that is to be replaced, and record this setting for later replication.

2 Replace the server-side Fibre Channel card.

2-1 Turn off the server for which the Fibre Channel card is to be replaced.

2-2 Replace the Fibre Channel card.
For details of the replacement procedure, refer to the user guide attached with the Fibre Channel card.

3 Adjust the settings as necessary, using the ETERNUS DX60/DX80/DX90's GUI or CLI.

3-1 Delete the setting of WWN or host affinity set to the uninstalled Fibre Channel card.

3-2 Referring to the information recorded in Step 1, register the information such as WWN or host affinity of the new Fibre Channel card in the ETERNUS DX60/DX80/DX90.

4 When the setting is complete, confirm that the server can access the ETERNUS DX60/DX80/DX90.

End of procedure

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9.4.2 Replacing LAN Cards / iSCSI HBAs

The following explains how to replace a failed LAN card or iSCSI HBA.
Note that this is only an overview of the replacement procedure. Refer to the relevant manuals for more details.

User guide for LAN card / iSCSI HBA
"ETERNUS DX Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX60/DX80/DX90 CLI User Guide"

The procedure to replace a LAN card / iSCSI HBA is as follows:

Procedure

1. Turn off the server whose LAN card or iSCSI HBA is to be replaced.
2. Replace the LAN card / iSCSI HBA.
   Refer to the documentation supplied with the LAN card or iSCSI HBA for the detailed replacement procedure.
3. When the setting is complete, confirm that the server can access the ETERNUS DX60/DX80.

End of procedure

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9.4.3 Replacing SAS Cards

The following explains how to replace a failed SAS card.
Note that this is only an overview of the replacement procedure. Refer to the relevant manuals for more details.

User guide for SAS card
"ETERNUS DX Disk storage systems Server Connection Guide (SAS)"
"ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX60/DX80/DX90 CLI User Guide"

The procedure to replace a SAS card is as follows:

Procedure

1 Before performing this procedure, use the ETERNUS DX60/DX80's GUI or CLI to check the SAS address or host affinity of the SAS card that is to be replaced, and record this setting for later replication.

2 Replace the server-side SAS card.

2-1 Turn off the server whose SAS card is to be replaced.

2-2 Replace the SAS card.
For details of the replacement procedure, refer to the user guide attached with the SAS card.

3 Adjust the settings as necessary, using the ETERNUS DX60/DX80's GUI or CLI.

3-1 Delete the SAS address or host affinity setting assigned to the removed SAS card.

3-2 Referring to the information recorded in Step 1, register the SAS address or host affinity of the new SAS card in the ETERNUS DX60/DX80.

4 When the setting is complete, confirm that the server can access the ETERNUS DX60/DX80.

End of procedure

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9.5 Troubleshooting

If you notice anything unusual during operation, then refer to "9.5.1 Check List" (page 206) to check the ETERNUS DX60/DX80/DX90 status, accurately record the status on the form given in "9.5.2 Trouble Record" (page 213), and contact your maintenance engineer.

- Unusual phenomena during operation of the ETERNUS DX60/DX80/DX90
- When the ETERNUS DX60/DX80/DX90 is turned off
- When the ETERNUS DX60/DX80/DX90 refuses to be turned on
- When the READY LED is not on
- When the FAULT LED is on
- When the FAULT LED blinks
- When an IP address is forgotten
- When the ETERNUS DX60/DX80/DX90 is no accessible via the network.
- When the license key cannot be registered
- When an ETERNUS DX60/DX80/DX90 related error message is displayed by the server
- When volume capacity is short
- When I/O access is slow
- When the server does not recognize the disks

9.5.1 Check List

Unusual phenomena during operation of the ETERNUS DX60/DX80/DX90

If the ETERNUS DX60/DX80/DX90 exhibits any of the following symptoms, unplug the ETERNUS DX60/DX80/DX90 and cut the AC power at the distribution board, then contact your maintenance engineer.

- Abnormally hot
- Unusual odor
- Emission of smoke
- Unusual noise
- Abnormal shaking

WARNING

- If the ETERNUS DX60/DX80/DX90 overheats, gives off smoke or an unusual odor, makes an unusual sound, or shakes abnormally, or is likely to be damaged by a power abnormality, immediately turn the ETERNUS DX60/DX80/DX90 off and then pull the power plug from the outlet.
  After a while, check that unusual phenomena has disappeared, then contact your maintenance engineer.

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When the ETERNUS DX60/DX80/DX90 is turned off

Check the following points. If none of these resolve the problem, leave the ETERNUS DX60/DX80/DX90 alone and contact your maintenance engineer.

- Is the ETERNUS DX60/DX80/DX90's power cord disconnected?
- Is main line switch of AC outlet box (MAIN LINE SWITCH) turned to OFF (O)?
- Is there a power failure?
- Has there been a recent main power failure?
  If the ETERNUS DX60/DX80/DX90 is in AC automatic power mode (i.e. AUTO POWER switch is turned to ON), the ETERNUS DX60/DX80/DX90 turns on automatically after the power is restored.

When the ETERNUS DX60/DX80/DX90 refuses to be turned on

Check the following points. If none of these resolve the problem, leave the ETERNUS DX60/DX80/DX90 alone and contact your maintenance engineer.

- Is the ETERNUS DX60/DX80/DX90's power cord disconnected?
- Is main line switch of AC outlet box (MAIN LINE SWITCH) turned to OFF (O)?
- Is the main power correctly being supplied?
- Is the miniSAS cable (for drive enclosures) disconnected?

When the READY LED is not on

If more than 10 minutes has passed since the ETERNUS DX60/DX80/DX90's power was turned on, and the READY LED still hasn't turned on, contact your maintenance engineer.

When the FAULT LED is on

Check the general status of GUI and perform the necessary action. If none of these resolve the problem, leave the ETERNUS DX60/DX80/DX90 alone and contact your maintenance engineer.

Note

When checking the general status via CLI, refer to "ETERNUS DX60/DX80/DX90 CLI User Guide".

Refer "ETERNUS DX60/DX80/DX90 CLI User Guide"

- When the general status of GUI is Error
  - Check whether one side of the miniSAS cable (for drive enclosures) is connected. If not, install the connector in the SAS port.
  - Check if the miniSAS cable (for drive enclosures) is connected. If the miniSAS cable (for drive enclosures) is not connected, connect it with the following procedure.

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Procedure

1. Press the controller enclosure's Power Switch for four seconds or more to turn off the ETERNUS DX60/DX80/DX90.
   Drive enclosures with no miniSAS cables connected will remain on.
2. Connect the miniSAS cable while the drive enclosure is on.
3. Press the controller enclosure's Power Switch to turn on the ETERNUS DX60/DX80/DX90.

End of procedure

- When the general status of GUI is Not Ready

  Check whether the miniSAS cables (for drive enclosures) are connected in the correct order. If not, reconnect the miniSAS cables in the following order.

Procedure

1. Press the controller enclosure's Power Switch for four seconds or more to turn off the ETERNUS DX60/DX80/DX90, and turn off the AC power.
2. Re-connect the miniSAS cable.
3. Make sure that power is being supplied, then turn the ETERNUS DX60/DX80/DX90 on.

End of procedure

When the FAULT LED blinks

Check the General Status in GUI. A General Status of Warning indicates that the ETERNUS DX60/DX80/DX90 contains a component that requires preventive maintenance.
Use the Storage System Status screen's device tree to check the detailed information on the component whose ⚠ image is on, and contact your maintenance engineer.

Note

When checking the general status and detailed information on products via CLI, refer to "ETERNUS DX60/DX80/DX90 CLI User Guide".

Refer "ETERNUS DX60/DX80/DX90 CLI User Guide"

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When an IP address is forgotten

Set a new IP address according to the following procedure.

Procedure

1. Remove the front cover of the 3.5" type controller enclosure.
   Remove the flange cover of the 2.5" type controller enclosure.
   For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).
   For details on how to attach the flange cover, refer to "3.4 Attaching and Removing the Flange Cover" (page 78).
2. Press the IP RESET Switch twice in a row within two seconds.
   The setting information related to the network is returned to the factory default.
3. Set a new IP address and other network information via GUI or CLI.
4. Write down the newly set IP address on the Network Settings label.

End of procedure

When the ETERNUS DX60/DX80/DX90 is no accessible via the network.

Check the following points:

- Is the ETERNUS DX60/DX80/DX90 turned off?
- Has the LAN cable become disconnected? For the dual controller model, does the controller to which the LAN cable is connected have an unlit MASTER LED?
- Have any network devices (such as hub or router) failed? Are the network device settings invalid?
- Is the ETERNUS DX60/DX80/DX90 connected using an invalid IP address or the RMT port's IP address?
- Are the environment settings for the network service invalid?
- Are the environment settings for the ETERNUS DX60/DX80/DX90 LAN port invalid?

If none of these problems are indicated, return the ETERNUS DX60/DX80/DX90 network settings to their default values.

Procedure

1. Remove the front cover of the 3.5" type controller enclosure.
   Remove the flange cover of the 2.5" type controller enclosure.
   For details on how to attach the front cover, refer to "3.3 Attaching and Removing the Front Cover" (page 75).
   For details on how to attach the flange cover, refer to "3.4 Attaching and Removing the Flange Cover" (page 78).

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2 Press the IP RESET Switch twice in a row within two seconds.

The setting information related to the network is returned to the factory default.

3 Set up the network environment, via GUI or CLI.

IMPORTANT Make sure that all of the desired network services are set to "Enable".

- If the GUI is to be used, set "http" and/or "https" to "Enable". If "Disable" is set, GUI access to the ETERNUS DX60/DX80/DX90 is not allowed.
- If the CLI is to be used, set "telnet" and/or "SSH" to "Enable". If "Disable" is set, GUI access to the ETERNUS DX60/DX80/DX90 is not allowed.
- If monitoring software is to be used, set "Maintenance" and/or "Maintenance-Secure" to "Enable". If "Disable" is set, monitoring software access to the ETERNUS DX60/DX80/DX90 is not allowed.
- If the "ping" command is to be used, set "ICMP" to "Enable". If "Disable" is set, the ETERNUS DX60/DX80/DX90 will not be able to respond to "pings".

4 Check that the ETERNUS DX60/DX80/DX90 can be connected to via each of the desired network services.

If not, contact your maintenance engineer.

End of procedure

When the license key cannot be registered

A wrong serial number may have been input when issuing the license key. If the problem persists, contact your sales representatives.
When issuing the license key again, make sure to check that [SER.NO.] (device serial number) that is described in the notification E-mail is correct.

When an ETERNUS DX60/DX80/DX90 related error message is displayed by the server

While you can continue using the ETERNUS DX60/DX80/DX90 for any work that is not affected by this problem, contact your maintenance engineer to determine the cause of the problem.

When volume capacity is short

Volume-adding function (LUN concatenation and RAID migration) and RAID-group-adding function (Logical Device Expansion function) can be used to resolve the capacity shortage of volumes.
Refer to "ETERNUS DX60/DX80/DX90 Web GUI User Guide" for details on how to use these functions.

"ETERNUS DX60/DX80/DX90 Web GUI User Guide"

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Refer to the following sections for details on these functions.

- "1.3.4 RAID Migration" (page 42)
- "1.3.5 Logical Device Expansion" (page 44)
- "1.3.6 LUN Concatenation" (page 45)

When I/O access is slow

Check the following:

- Check that the ambient temperature does not exceed the operating environment conditions. If so, Nearline SAS disk performance may be reduced.
- Click the icon of each part in the Storage System Status screen of GUI to check if an abnormality is detected in ETERNUS DX60/DX80/DX90 parts.
  If an abnormality is detected, contact your maintenance engineer.
- Check the path status.
  - When using ETERNUS Multipath Driver, start ETERNUS Multipath Manager.
    For Windows®, click [Start] - [Program] - [ETERNUS Multipath Driver] - [ETERNUS Multipath Manager] to start ETERNUS Multipath Manager.
    If an abnormality is detected in a path, refer to ETERNUS Multipath Driver manuals and follow the direction given in the manuals.

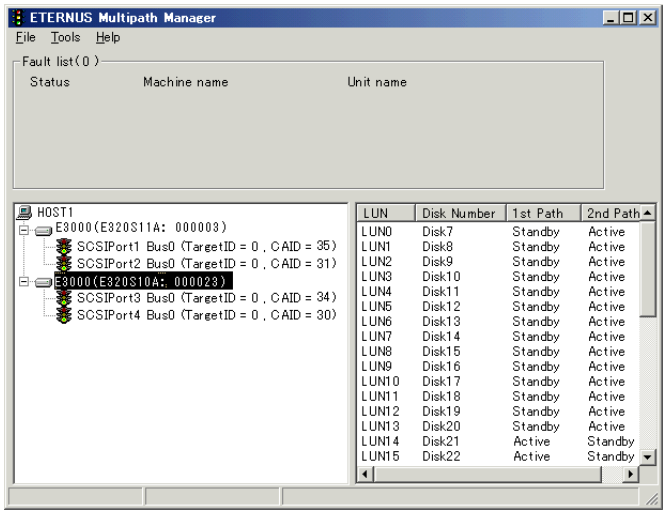
ETERNUS Multipath Manager
File Tools Help
Fault list(0)
Status
Machine name
Unit name
HOST1
E3000(E320S11A: 000003)
SCSIPort1 Bus0 (TargetID = 0 , CAID = 35)
SCSIPort2 Bus0 (TargetID = 0 , CAID = 31)
E3000(E320S10A: 000023)
SCSIPort3 Bus0 (TargetID = 0 , CAID = 34)
SCSIPort4 Bus0 (TargetID = 0 , CAID = 30)
LUN Disk Number 1st Path 2nd Path
LUN0 Disk7 Standby Active
LUN1 Disk8 Standby Active
LUN2 Disk9 Standby Active
LUN3 Disk10 Standby Active
LUN4 Disk11 Standby Active
LUN5 Disk12 Standby Active
LUN6 Disk13 Standby Active
LUN7 Disk14 Standby Active
LUN8 Disk15 Standby Active
LUN9 Disk16 Standby Active
LUN10 Disk17 Standby Active
LUN11 Disk18 Standby Active
LUN12 Disk19 Standby Active
LUN13 Disk20 Standby Active
LUN14 Disk21 Active Standby
LUN15 Disk22 Active Standby

Figure 9.1 ETERNUS Multipath Manager Window

  - When not using ETERNUS Multipath Driver, use the path management tool and check the path status that each software provides, and handle the problem if necessary.
- Check the loading of the ETERNUS DX60/DX80/DX90. If the load is out of balance because of operation content changing and so forth.
- When the cause is not identified, contact your maintenance engineer.

Refer "ETERNUS DX60/DX80/DX90 Web GUI User Guide"
ETERNUS Multipath Driver manuals

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When the server does not recognize the disks

When the server does not recognize the disks, points to be checked depend on the situation.

- All servers do not recognize the disks
  - Check the status of the ETERNUS DX60/DX80/DX90 and other devices such as network devices connecting the server and the ETERNUS DX60/DX80/DX90, and ensure that there are no problems with the power supply.
  - Check if the drive enclosure is turned on. If the drive enclosure is not turned on, check if the miniSAS cables (for drive enclosures) are connected. If the miniSAS cables are not connected, connect them with the following procedure.

Procedure

1. Press the controller enclosure's Power Switch for four seconds or more to turn off the ETERNUS DX60/DX80/DX90.
2. Connect the miniSAS cables.
3. Press the controller enclosure's Power Switch to turn on the ETERNUS DX60/DX80/DX90.

End of procedure

- Specific servers do not recognize the disks

  If the specific servers do not recognize the disks (while other servers can), check the following points. If none of these resolve the problem, leave the ETERNUS DX60/DX80/DX90 alone and contact your maintenance engineer.

  - Check the path status.
    Check if an error occurs in a path by using a path management tool such as ETERNUS Multipath Manager. When an error occurs, contact your maintenance engineer
  - If an error occurs in a Fibre Channel card or adapter in the server, replace the Fibre Channel card or adapter, referring to "9.4.1 Replacing Fibre Channel Cards" (page 203), "9.4.2 Replacing LAN Cards / iSCSI HBAs" (page 204), or "9.4.3 Replacing SAS Cards" (page 205).

Refer

ETERNUS Multipath Driver manuals
User guides for server-side cards and adapters
"ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS DX Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS DX Disk storage systems Server Connection Guide (SAS)"
"ETERNUS DX60/DX80/DX90 Web GUI User Guide"

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9.5.2 Trouble Record

If trouble occurs, record the ETERNUS DX60/DX80/DX90 conditions in Figure 9.2 and Figure 9.3, and contact your maintenance engineer.

Trouble Record

1: Please identify your ETERNUS DX60/DX80/DX90 Disk storage system:
(Check the Manufacturer's label)
MODEL _____
SER.NO. _____

2: Please enter the following information about your
ETERNUS DX60/DX80/DX90:
Number of drive enclosures _____
Number of disks _____

3: Are you using a UPS? If so, what model?

_____

4: Are you using a PMAN? If so, what model?

_____

5: What is the state of the following Controller Enclosure LEDs?

POWER	(Yes, No)
READY	(Yes, No)
FAULT	(Yes, No, Blinking)
IDENTIFY	(Yes, No)
CACHE	(Yes, No, Blinking)

6: What is the state of the following Drive Enclosure LEDs?

POWER	(Yes, No)
READY	(Yes, No)
FAULT	(Yes, No, Blinking)
IDENTIFY	(Yes, No)

Figure 9.2 Trouble record (1/2)

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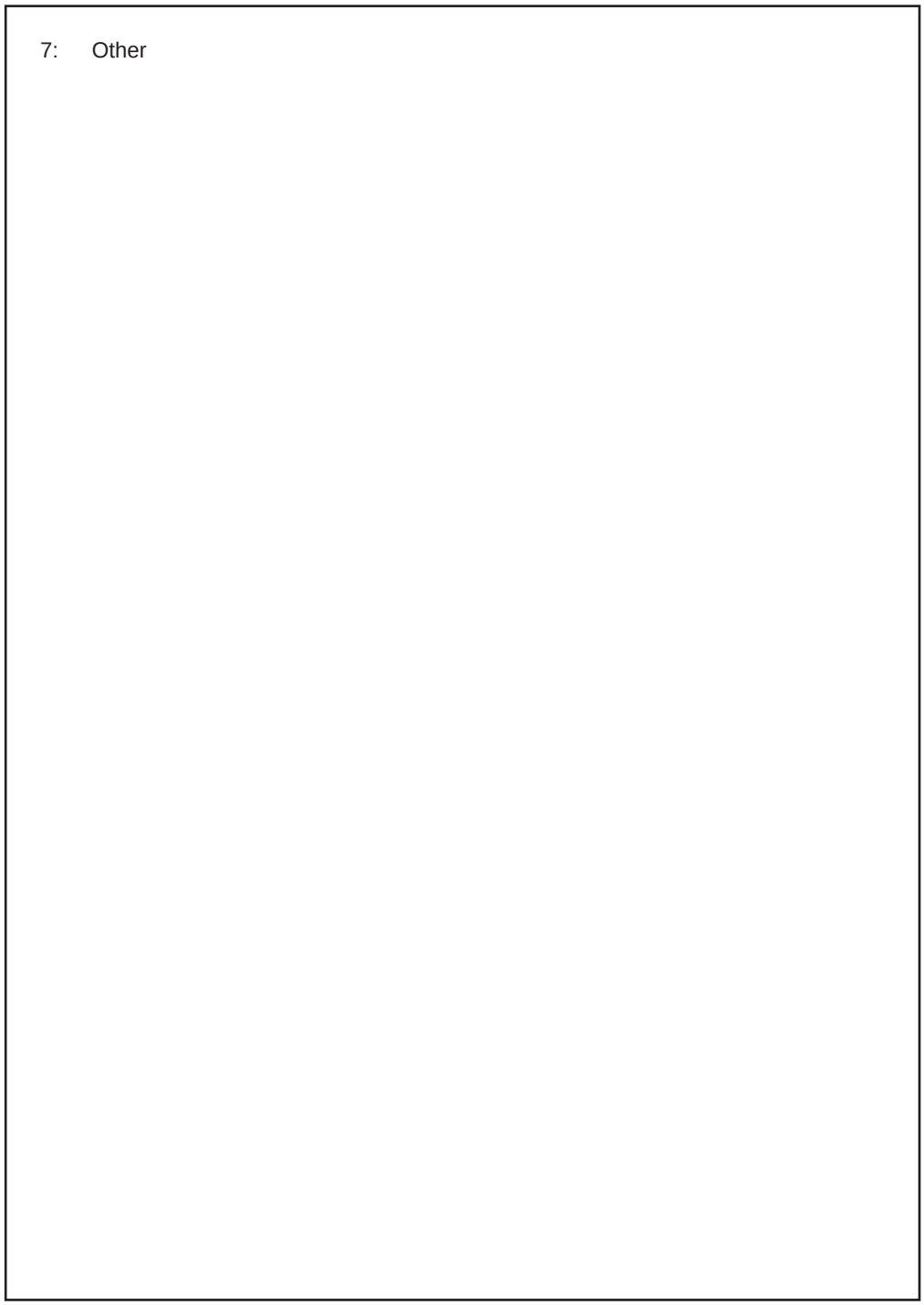

Figure 9.3 Trouble record (2/2)

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Appendix A Specifications

This appendix explains the specifications of the ETERNUS DX60/DX80/DX90 and its optional products.

A.1 Device Specifications

This section explains the ETERNUS DX60/DX80/DX90 specifications.

A.1.1 ETERNUS DX60 Specifications

Table A.1 ETERNUS DX60 specifications

Item		3.5" disk model		2.5" disk model	
		Single-controller model	Dual-controller model	Single-controller model	Dual-controller model
Model name	Fibre Channel model	ET06F12AU	ET06F22AU	ET06F12BU	ET06F22BU
	iSCSI model	ET06L12AU	ET06L22AU	–	
	SAS model	ET06S12AU	ET06S22AU	–	
Supported RAID level		RAID0, RAID1, RAID1+0, RAID5, RAID5+0, RAID6			
Maximum physical capacity (*1)	SAS disks	14.4TB		7.2TB	
	Nearline SAS disks	48.0TB		–	
Maximum logical capacity (*2)	SAS disks	101.1TB		5.0TB	
	Nearline SAS disks	33.8TB		–	
Number of controllers		1	2	1	2
Host interface		Fibre Channel (4Gbit/s, 2Gbit/s, 1Gbit/s) iSCSI (1Gbit/s) SAS (3Gbit/s)		Fibre Channel (4Gbit/s, 2Gbit/s, 1Gbit/s)	
Number of host interfaces		2	4	2	4
Maximum number of servers to be connected	Fibre Channel model	32	64	32	64
	iSCSI model	32	64	–	–
	SAS model	2	4	–	–
Cache		1GB	2GB	1GB	2GB
Number of disks		2 to 24			

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Item			3.5" disk model		2.5" disk model	
			Single-controller model	Dual-controller model	Single-controller model	Dual-controller model
Disk capacity (speed)	3.5" SAS disks		300GB/450GB/600GB (15,000rpm)		–	
	3.5" Nearline SAS disks		750GB/1TB/2TB (7,200rpm)		–	
	2.5" SAS disks		–		146GB/300GB (10,000rpm)	
Drive interface			SAS (3Gbit/s)			
Dimensions (W × D × H)	Basic		483 × 650 × 88 (mm) [2U]		483 × 650 × 88 (mm) [2U]	
	Maximum		483 × 650 × 177 (mm) [4U]		–	
Maximum weight			70kg		35kg	
Power	Voltage		AC 100 – 120V, AC 200 – 240V			
	Phase		Single			
	Frequency		50Hz/60Hz			
Maximum power consumption		AC 100 – 120V	800W		410W	
		AC 200 – 240V	790W		410W	
Maximum heat generation		AC 100 – 120V	2,880kJ/h		1,476kJ/h	
		AC 200 – 240V	2,844kJ/h		1,476kJ/h	
Environmental conditions	Temperature		5 – 40°C (operating)			
	Humidity		20 – 80%RH (operating)			
Noise emission	Sound Power Level (LWAd) (*3)		5.9B		6.0B	
	Sound Pressure Level (LpAm) (*3)		42.0dB(A)		43.5dB(A)	

*1: Physical capacity is calculated based on the assumption 1TB=1,000^{4}Byte, 1GB=1,000^{3}Byte.

*2: Logical capacity is calculated based on the assumption 1TB=1,024^{4}Byte and being formatted in the recommended RAID5 configuration. The possible capacity for use depends on the environment conditions.

*3: Value for a single controller enclosure.

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A.1.2 ETERNUS DX80 Specifications

Table A.2 ETERNUS DX80 specifications

Item		3.5" disk model		2.5" disk model	
		Single-controller model	Dual-controller model	Single-controller model	Dual-controller model
Model name	Fibre Channel model	ET08E12AU ET08F12AU	ET08E22AU ET08F22AU	ET08E12BU ET08F12BU	ET08E22BU ET08F22BU
	iSCSI model	ET08L12AU	ET08L22AU	–	
	SAS model	ET08S12AU	ET08S22AU	–	
Supported RAID level		RAID0, RAID1, RAID1+0, RAID5, RAID5+0, RAID6			
Maximum physical capacity (*1)	SAS disks	72.0TB		36.0TB (*3)	
	Nearline SAS disks	240.0TB		–	
	SSDs	1.0TB	1.8TB	1.0TB	1.8TB
Maximum logical capacity (*2)	SAS disks	52.7TB		26.3TB (*3)	
	Nearline SAS disks	176.1TB		–	
	SSDs	0.5TB	1.0TB	0.5TB	1.0TB
Number of controllers		1	2	1	2
Host interface		Fibre Channel (8Gbit/s, 4Gbit/s, 2Gbit/s) Fibre Channel (4Gbit/s, 2Gbit/s, 1Gbit/s) iSCSI (1Gbit/s) SAS (3Gbit/s)		Fibre Channel (8Gbit/s, 4Gbit/s, 2Gbit/s) Fibre Channel (4Gbit/s, 2Gbit/s, 1Gbit/s)	
Number of host interfaces		2	4	2	4
Maximum number of servers to be connected	Fibre Channel model	64	128	64	128
	iSCSI model	64	128	–	–
	SAS model	2	4	–	–
Cache capacity		2GB	4GB	2GB	4GB
Number of disks (*4)		2 to 120			
Disk capacity (Speed)	3.5" SAS disks	300GB/450GB/600GB (15,000rpm)		300GB/450GB/600GB (15,000rpm) (*5)	
	3.5" Nearline SAS disks	750GB/1TB/2TB (7,200rpm)		750GB/1TB/2TB (7,200rpm) (*5)	
	3.5" SSDs	100GB/200GB		100GB/200GB (*5)	
	2.5" SAS disks	–		146GB/300GB (10,000rpm)	
	2.5" SSDs	–		100GB/200GB	
Drive interface		SAS (3Gbit/s)			
Dimensions (W × D × H)	Basic	483 × 650 × 88 (mm) [2U]		483 × 650 × 88 (mm) [2U]	
	Maximum	483 × 650 × 889 (mm) [20U]		483 × 650 × 444 (mm) [10U] (*3)	
Maximum weight		350kg		175kg (*3)	

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Item			3.5" disk model		2.5" disk model	
			Single-controller model	Dual-controller model	Single-controller model	Dual-controller model
Power	Voltage		AC 100 – 120V, AC 200 – 240V			
	Phase		Single			
	Frequency		50Hz/60Hz			
Maximum power consumption		AC 100 – 120V	3,750W		1,880W (*3)	
		AC 200 – 240V	3,740W		1,840W (*3)	
Maximum heat generation		AC 100 – 120V	13,500kJ/h		6,768kJ/h (*3)	
		AC 200 – 240V	13,464kJ/h		6,624kJ/h (*3)	
Environmental conditions	Temperature		5 – 40°C (operating)			
	Humidity		20 – 80%RH (operating)			
Noise emission	Sound Power Level (LWAd) (*6)		5.9B		6.0B	
	Sound Pressure Level (LpAm) (*6)		42.0dB(A)		43.5dB(A)	

*1: Physical capacity is calculated based on the assumption 1TB=1,000^{4}Byte, 1GB=1,000^{3}Byte.

*2: Logical capacity is calculated based on the assumption 1TB=1,024^{4}Byte and being formatted in the recommended RAID5 configuration. The possible capacity for use depends on the environment conditions.

*3: When 120 of 2.5" disk are installed.

*4: Up to five SSDs can be installed in the single controller model, and up to nine SSDs can be installed in the dual controller model.

*5: Can be installed in 3.5" type drive enclosures.

*6: Value for a single controller enclosure.

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A.1.3 ETERNUS DX90 Specifications

Table A.3 ETERNUS DX90 specifications

Item			3.5" disk model		2.5" disk model	
			Single-controller model	Dual-controller model	Single-controller model	Dual-controller model
Model name	Fibre Channel model		ET09E14AU	ET09E24AU	ET09E14BU	ET09E24BU
Supported RAID level			RAID0, RAID1, RAID1+0, RAID5, RAID5+0, RAID6			
Maximum physical capacity (*1)	SAS disks		72.0TB		36.0TB (*3)	
	Nearline SAS disks		240.0TB		–	
	SSDs		1.0TB	1.8TB	1.0TB	1.8TB
Maximum logical capacity (*2)	SAS disks		52.7TB		26.3TB (*3)	
	Nearline SAS disks		176.1TB		–	
	SSDs		0.5TB	1.0TB	0.5TB	1.0TB
Number of controllers			1	2	1	2
Host interface			Fibre Channel (8Gbit/s, 4Gbit/s, 2Gbit/s)			
Number of host interfaces			4	8	4	8
Maximum number of servers to be connected			128	256	128	256
Cache capacity			2GB	4GB	2GB	4GB
Number of disks (*4)			2 to 120			
Disk capacity (Speed)	3.5" SAS disks		300GB/450GB/600GB (15,000rpm)		300GB/450GB/600GB (15,000rpm) (*5)	
	3.5" Nearline SAS disks		750GB/1TB/2TB (7,200rpm)		750GB/1TB/2TB (7,200rpm) (*5)	
	3.5" SSDs		100GB/200GB		100GB/200GB (*5)	
	2.5" SAS disks		–		146GB/300GB (10,000rpm)	
	2.5" SSDs		–		100GB/200GB	
Drive interface			SAS (3Gbit/s)			
Dimensions (W × D × H)	Basic		483 × 650 × 88 (mm) [2U]		483 × 650 × 88 (mm) [2U]	
	Maximum		483 × 650 × 889 (mm) [20U]		483 × 650 × 444 (mm) [10U] (*3)	
Maximum weight			350kg		175kg (*3)	
Power	Voltage		AC 100 – 120V, AC 200 – 240V			
	Phase		Single			
	Frequency		50Hz/60Hz			
Maximum power consumption		AC 100 – 120V	3,760W		1,890W (*3)	
		AC 200 – 240V	3,740W		1,850W (*3)	
Maximum heat generation		AC 100 – 120V	13,536kJ/h		6,805kJ/h (*3)	
		AC 200 – 240V	13,464kJ/h		6,660kJ/h (*3)	

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Item		3.5" disk model		2.5" disk model	
		Single-controller model	Dual-controller model	Single-controller model	Dual-controller model
Environmental conditions	Temperature	5 – 40°C (operating)			
	Humidity	20 – 80%RH (operating)			
Noise emission	Sound Power Level (LWAd) (*6)	5.9B		6.0B	
	Sound Pressure Level (LpAm) (*6)	42.0dB(A)		43.5dB(A)	

*1: Physical capacity is calculated based on the assumption 1TB=1,000^{4}Byte, 1GB=1,000^{3}Byte.

*2: Logical capacity is calculated based on the assumption 1TB=1,024^{4}Byte and being formatted in the recommended RAID5 configuration. The possible capacity for use depends on the environment conditions.

*3: When 120 of 2.5" disk are installed.

*4: Up to five SSDs can be installed in the single controller model, and up to nine SSDs can be installed in the dual controller model.

*5: Can be installed in 3.5" type drive enclosures.

*6: Value for a single controller enclosure.

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A.2 Optional Product Specifications

This section explains the specifications of the ETERNUS DX60/DX80/DX90 optional products.

A.2.1 Disks

For 3.5" disks

- 300GB/15krpm SAS disks

Table A.4 300GB/15krpm SAS disk specifications

Item	Specification
Model name	ETLSA3HAU, ETLSA3MAU, ETLSA3PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	3.5" hard disk
Capacity	300GB
Speed	15,000rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.9 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 450GB/15krpm SAS disks

Table A.5 450GB/15krpm SAS disk specifications

Item	Specification
Model name	ETLSA4HAU, ETLSA4MAU, ETLSA4PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	3.5" hard disk
Capacity	450GB
Speed	15,000rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.9 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

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- 600GB/15krpm SAS disks

Table A.6 600GB/15krpm SAS disk specifications

Item	Specification
Model name	ETLSA6HAU, ETLSA6MAU, ETLSA6PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	3.5" hard disk
Capacity	600GB
Speed	15,000rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.9 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 750GB/7.2krpm Nearline SAS disks

Table A.7 750GB/7.2krpm Nearline SAS disk specifications

Item	Specification
Model name	ETLNS7HAU, ETLNS7MAU, ETLNS7PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	3.5" hard disk
Capacity	750GB
Speed	7,200rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	1.0 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 1TB/7.2krpm Nearline SAS disks

Table A.8 1TB/7.2krpm Nearline SAS disk specifications

Item	Specification
Model name	ETLNS1HAU, ETLNS1MAU, ETLNS1PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	3.5" hard disk
Capacity	1TB
Speed	7,200rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	1.0 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

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- 2TB/7.2krpm Nearline SAS disks

Table A.9 2TB/7.2krpm Nearline SAS disk specifications

Item	Specification
Model name	ETLNS2HAU, ETLNS2MAU, ETLNS2PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	3.5" hard disk
Capacity	2TB
Speed	7,200rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	1.0 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 100GB SSDs

Table A.10 100GB SSD specifications

Item	Specification
Model name	ETLSS1HAU, ETLSS1MAU, ETLSS1PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	Flash memory
Capacity	100GB
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.5 kg

*1: Specification per one SSD.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 200GB SSDs

Table A.11 200GB SSD specifications

Item	Specification
Model name	ETLSS2HAU, ETLSS2MAU, ETLSS2PAU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	Flash memory
Capacity	200GB
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.5 kg

*1: Specification per one SSD.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

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For 2.5" disks

- 146GB/10krpm SAS disks

Table A.12 146GB/10krpm SAS disk specifications

Item	Specification
Model name	ETLSA1HBU, ETLSA1MBU, ETLSA1PBU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	2.5" hard disk
Capacity	146GB
Speed	10,000rpm
Dimensions (W × D × H)	19 × 142 × 81 (mm)
Weight	0.3 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 300GB/10krpm SAS disks

Table A.13 300GB/10krpm SAS disk specifications

Item	Specification
Model name	ETLSA3HBU, ETLSA3MBU, ETLSA3PBU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	2.5" hard disk
Capacity	300GB
Speed	10,000rpm
Dimensions (W × D × H)	19 × 142 × 81 (mm)
Weight	0.3 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 100GB SSDs

Table A.14 100GB SSD specifications

Item	Specification
Model name	ETLSS1HBU, ETLSS1MBU, ETLSS1PBU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	Flash memory
Capacity	100GB
Dimensions (W × D × H)	19 × 142 × 81 (mm)
Weight	0.3 kg

*1: Specification per one SSD.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

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- 200GB SSDs

Table A.15 200GB SSD specifications

Item	Specification
Model name	ETLSS2HBU, ETLSS2MBU, ETLSS2PBU
Drive Interface	Serial Attached SCSI (3Gbit/s)
Storage medium	Flash memory
Capacity	200GB
Dimensions (W × D × H)	19 × 142 × 81 (mm)
Weight	0.3 kg

*1: Specification per one SSD.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

A.2.2 Drive Enclosures

For 3.5" type drive enclosures

Table A.16 3.5" type drive enclosure specifications

Item		Specification	
Model name		ETLDE2AU	ETLDE1AU
Drive interface		Serial Attached SCSI (3Gbit/s)	
Number of disk slots		12	
Number of expanders		2	1
Dimensions (W × D × H)		483 × 650 × 88 (mm) [2U]	
Maximum weight		35kg	
Power	Voltage	AC 100 – 120V, AC 200 – 240V	
	Phase	Single	
	Frequency	50Hz/60Hz	
Maximum power consumption	AC 100 – 120V	370W	
	AC 200 – 240V	370W	
Maximum heat generation	AC 100 – 120V	1,332kJ/h	
	AC 200 – 240V	1,332kJ/h	
Environmental condition	Temperature	5 – 40°C (operating)	
	Humidity	20 – 80%RH (operating)	

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For 2.5" type drive enclosures

Table A.17 2.5" type drive enclosure specifications

Item		Specification	
Model name		ETLDE2BU	ETLDE1BU
Drive interface		Serial Attached SCSI (3Gbit/s)	
Number of disk slots		24	
Number of expanders		2	1
Dimensions (W × D × H)		483 × 650 × 88 (mm) [2U]	
Maximum weight		35kg	
Power	Voltage	AC 100 – 120V, AC 200 – 240V	
	Phase	Single	
	Frequency	50Hz/60Hz	
Maximum power consumption	AC 100 – 120V	370W	
	AC 200 – 240V	360W	
Maximum heat generation	AC 100 – 120V	1,332kJ/h	
	AC 200 – 240V	1,296kJ/h	
Environmental condition	Temperature	5 – 40°C (operating)	
	Humidity	20 – 80%RH (operating)	

A.2.3 AC Outlet Box

For 1U

Table A.18 AC outlet box (1U) specifications

Item		Specification
Model name		ETLAC2U1U
Power	Voltage	AC 200 – 240V
	Phase	Single
	Frequency	50Hz/60Hz
Inlet	Connection type and length	Plug: IEC320-C13 ⇔ NEMA L6-15P / 4m
	Number of inlets	2
Outlet	Connection type and length	Plug: IEC320-C13 ⇔ IEC320-C14 / 3m
	Number of outlets	4
Dimensions (U)		1U
Weight		2.0 kg

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For 2U

Table A.19 AC outlet box (2U) specifications

Item		Specification
Model name		ETLAC2U2U
Power	Voltage	AC 200 – 240V
	Phase	Single
	Frequency	50Hz/60Hz
Inlet	Connection type and length	Straight-through ⇔ NEMA L6-20P / 4m
	Number of inlets	2
Outlet	Connection type and length	Plug: IEC320-C13 ⇔ IEC320-C14 / 3m
	Number of outlets	12
Dimensions (U)		2U
Weight		11kg

A.2.4 Expansion Controller

For 3.5" disk model

Table A.20 Expansion controller specifications

Item	Specification
Model name	ETLC8F8AU, ETLC8F4AU, ETLC6F4AU, ETLC8L1AU, ETLC6L1AU, ETLC8S3AU, ETLC6S3AU, ETLC9E8AU
Dimensions (W × D × H)	205 × 375 × 42 (mm)
Weight	2.5 kg

For 2.5" disk model

Table A.21 Expansion controller specifications

Item	Specification
Model name	ETLC6F4BU, ETLC8F8BU, ETLC8F4BU, ETLC9E8BU
Dimensions (W × D × H)	205 × 375 × 42 (mm)
Weight	3.0 kg

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A.2.5 Expansion Expander

For 3.5" disk model

Table A.22 Expansion expander specifications

Item		Specification
Model name		ETLEXAU
Dimensions (W × D × H)		205 × 375 × 42 (mm)
Maximum weight		1.8kg
miniSAS cable	Connection type and length	SFF-8088 ⇔ SFF-8088 / 0.75m
	Number of cables	1

For 2.5" disk model

Table A.23 Expansion expander specifications

Item		Specification
Model name		ETLEXBU
Dimensions (W × D × H)		205 × 375 × 42 (mm)
Maximum weight		2.0 kg
miniSAS cable	Connection type and length	SFF-8088 ⇔ SFF-8088 / 0.75m
	Number of cables	1

A.2.6 Extension Cable Kit

Table A.24 Extension cable kit specifications

Item	Specification
Model name	ETLCAMS1U
Connection type and length	SFF-8088 ⇔ SFF-8088 / 3m
Number of cables	1

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Appendix B Events detected by ServerView

This chapter explains the ETERNUS DX60/DX80/DX90 events detected by ServerView.

Table B.1 ServerView event list

Event	Severity	Specific TRAP number	Meaning
Item fault	CRITICAL	2	Hardware error occurred.
Item warning	MAJOR	5	Preventive Maintenance Hardware has been detected.
Sensor status changed	CRITICAL	6	Temperature abnormality has been detected.
Maintenance required	CRITICAL	7	An error that requires maintenance has been detected.
Information event (*1)	INFORMATIONAL	9	Information
Item fault to normal (*1)	INFORMATIONAL	22	"Item fault" type problem has been resolved.
Item warning to normal (*1)	INFORMATIONAL	25	"Item warning" type problem has been resolved.
Sensor status changed to normal (*1)	INFORMATIONAL	26	"Sensor status changed" type problem has been resolved.

*1: The default setting is "Disable" (no notification).

The detected event notification settings can be changed via the GUI or CLI.
For details, refer to the "ETERNUS DX60/DX80/DX90 Web GUI User Guide" or "ETERNUS DX60/DX80/DX90 CLI User Guide".

"ETERNUS DX60/DX80/DX90 Web GUI User Guide"
"ETERNUS DX60/DX80/DX90 CLI User Guide"

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Appendix C About Using of Open Sources

The SMI-S interface of the ETERNUS DX60/DX80/DX90 uses the following open sources.

- OpenPegasus
- OpenSSL

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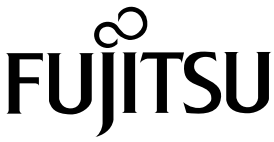
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